WESTERN BIRDS

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Cover photo by © Ronald L. Branson of Monterey, California: Short-tailed Albatross (*Phoebastria albatrus*), Monterey Bay, California, December, 1998.

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WESTERN BIRDS

Volume 31, Number 1, 2000

REPORT OF THE CALIFORNIA BIRD RECORDS COMMITTEE: 1997 RECORDS

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ABSTRACT: The California Bird Records Committee assessed 241 records of 98 species in the past year, accepting 173 of them. New to California were the Great-winged Petrel (*Pterodroma macroptera*), photographed and videotaped at the Cordell Bank off Marin County, the Band-tailed Gull (*Larus belcheri*), photographed at the Tijuana River mouth, San Diego County, and Couch's Kingbird (*Tyrannus couchii*), photographed and audiotaped at Fullerton, Orange County. With the recognition of the Long-billed Murrelet (Brachyramphus perdix) and Blue-headed Vireo (Vireo solitarius) as species, plus more recent additions, California's bird list stands at 613 species.

This 23rd report of the California Bird Records Committee (hereafter CBRC or Committee) details the evaluation of 241 records of 98 species. Most (156) of these records are from 1997, although 47 records are from 1996 and 38 others are from as early as 1974. A total of 173 records of 68 species was accepted, for an acceptance rate of 71.8%. Sixty-four records of 49 species were not accepted because the identification was not established, while four records of three species were not accepted because of questionable natural occurrence. The Committee is indebted to the 242 observers who put forth considerable effort to document the records discussed here. Counties best represented by accepted records are Orange (17 records), Monterey (16), Inyo (14), Los Angeles (14), Kern (11), Ventura (11), and San Diego (10). Records from 18 other counties were also accepted. As is typical, most accepted records (125, or 72%) were from coastal counties. Of the 48 accepted records from inland counties, the vast majority (41) were from southern California.

Highlights include the addition of the Great-winged Petrel (*Pterodroma macroptera*), Band-tailed Gull (*Larus belcheri*), and Couch's Kingbird (*Tyrannus couchii*) to the California list. The first formally accepted records of the recently split Long-billed Murrelet (*Brachyramphus perdix*) are

presented, and the first state record of Swallow-tailed Gull (*Creagrus furcatus*), previously not accepted on the grounds of questionable natural occurrence (Heindel and Garrett 1995), was accepted after reevaluation. Records of Bulwer's Petrel (*Bulweria bulwerii*), Bristle-thighed Curlew (*Numenius tahitiensis*), American Woodcock (*Scolopax minor*), Iceland Gull (*Larus glaucoides*), Bridled Tern (*Sterna anaethetus*), and Olive-backed Pipit (*Anthus hodgsoni*), all recently accepted to the state list, will be treated in subsequent reports. In addition, the first formally accepted records of the recently split Blue-headed Vireo (*Vireo solitarius*) and the first accepted records of the Harris's Hawk (*Parabuteo unicinctus*) since the species was listed as extirpated will be treated in later reports. With all of these additions, California's list stands at 613 species. Potential first state records of the Shy Albatross (*Thalassarche cauta*), Glossy Ibis (*Plegadis falcinellus*), Northern Bobwhite (*Colinus virginianus*), Slaty-backed Gull (*Larus schistisagus*), Eurasian Collared-Dove (*Streptopelia decaocto*), Eastern Bluebird (*Sialia sialis*), and Gray Silky-flycatcher (*Ptilogonys cinereus*) are currently being considered.

Other highlights include acceptance of the state's second Common Black-Hawk (*Buteogallus anthracinus*), third Purple Gallinule (*Porphyrula martinica*), fifth Sedge Wren (*Cistothorus platensis*) and Smith's Longspur (*Calcarius pictus*), sixth Dark-rumped Petrel (*Pterodroma phaeopygia*), and seventh Wedge-rumped Storm-Petrel (*Oceanodroma tethys*), as well as 10 Manx Shearwaters (*Puffinus puffinus*), returning Sandwich (*Sterna sandvicensis*) and Sooty (*Sterna fuscata*) terns, four Yellow-bellied Flycatchers (*Empidonax flaviventris*), four Dusky Warblers (*Phylloscopus fuscatus*), five White Wagtails (*Motacilla alba*), and three Black Rosy-Finches (*Leucosticte atrata*).

Annual reports traditionally include the acceptance rate for the report and estimate whether this rate is above or below average. Binford (1985) analyzed acceptance rates for the first seven annual reports. Figure 1 shows acceptance rates published by year in each report through the present. The overall nonweighted average is 81.6%. A low of 67% in the 14th report

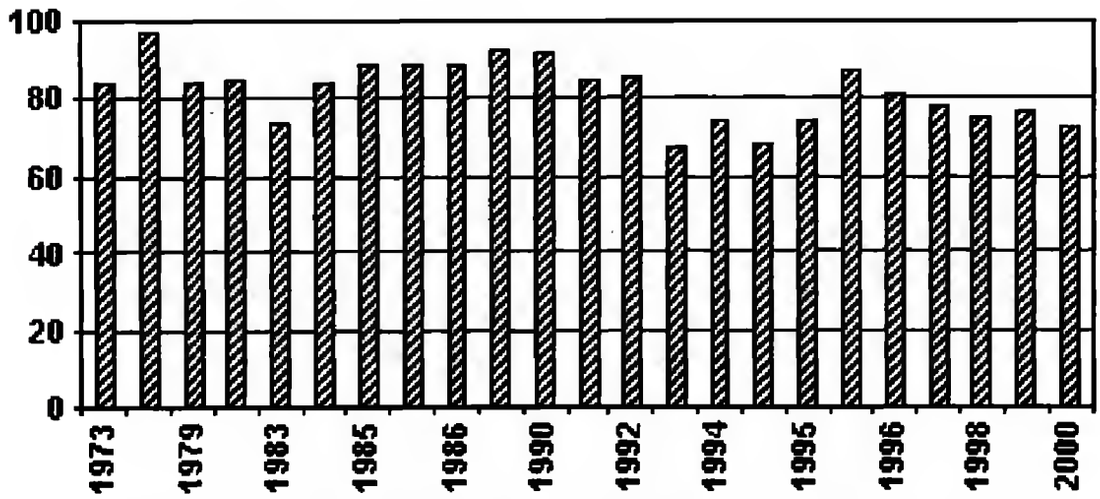

Figure 1. Acceptance rate in each California Bird Records Committee report since the committee's inception. The average unweighted acceptance rate is 81.6%.

(Roberson 1993) was almost certainly caused by that report's including the review of old records. In the 16th report, Heindel and Garrett (1995) attributed the below-average 68% acceptance rate, in part, to a more conservative Committee. While the low rates in the 14th and 16th reports have not been duplicated in recent years, this chart shows that acceptance rates exceeded the average only once in the decade since the 14th report, while they exceed it every year, but one, in the two decades prior to the 14th report. Thus acceptance rates are lower now than in the past. Some of this change may be attributed to a more conservative Committee membership, but it may also be caused by an increase in the number of records and contributors. The Committee has been able to review a higher percentage of total rarity claims now than in the past, and this may add to lower recent acceptance rates. Changes in species reviewed may also contribute. In the first two decades the Committee evaluated records of many species that are now known to occur regularly and are thus no longer on the review list. Today a higher percentage is of true accidentals and extreme rarities. In general the quality of the documentation has been excellent and it continues to improve steadily.

Committee News. The Committee's voting membership after the January 1999 meeting consisted of Richard A. Erickson (chair), Matthew T. Heindel (vice chair), Michael M. Rogers (secretary), Robert A. Hamilton, Alvaro Jaramillo, Guy McCaskie, Joseph Morlan, Michael A. Patten, Peter Pyle, and Stephen C. Rottenborn. Recent Committee members who also voted on many of the records in this report include Kimball L. Garrett, Steve N. G. Howell, Mike San Miguel, Daniel S. Singer, and Scott B. Terrill.

At its 1999 meeting, the Committee discussed the need for increased CBRC involvement with local bird clubs and other records committees (both in and out of the state). The possibility of revising review procedures to include records that are unusual regionally or temporally, even if a species occurs regularly in at least part of the state, was also discussed and will be investigated further. Two species, the Zone-tailed Hawk (*Buteo albonotatus*) and Philadelphia Vireo (*Vireo philadelphicus*), were removed from the review list; the Committee will not review records of these species after 1998.

The list of species reviewed by the CBRC is posted on the Western Field Ornithologists' World Wide Web site (http://www.wfo-cbrc.org/cbrc/). This site includes the California state list, the Committee's bylaws, a reporting form for e-mail submission of records, addresses of current Committee members, a list of relevant publications by CBRC members, and other information about the CBRC, Western Field Ornithologists, and *Western Birds*. A photo gallery of recent submissions, including a number of birds published in this report, is also available on the web site.

All records reviewed by the CBRC (including copies of descriptions, photographs, videotapes, audio recordings, and Committee comments) are archived at the Western Foundation of Vertebrate Zoology, 439 Calle San Pablo, Camarillo, California 93012, and are available for public review. The CBRC solicits and encourages observers to submit documentation for all species on the review list, as well as species unrecorded in California. Documentation should be sent to Michael M. Rogers, CBRC Secretary, P. O. Box 340, Moffett Field, CA 94035-0340 (e-mail: mrogers@nas.nasa.gov).

Format and Abbreviations. As in other recent CBRC reports, records are usually listed chronologically by first date of occurrence and/or geographically, from north to south. Included with each record is the location, county abbreviation (see below), and date span. The date span usually follows that published in the journal variously titled *American Birds*, *National Audubon Society Field Notes*, or *Field Notes* (now *North American Birds*), but if the CBRC accepts a date span that differs from a published source, the differing dates are italicized. Records not previously published in *North American Birds* are so noted. Initials of the observer(s) responsible for finding and/or identifying the bird(s), if they have supplied documentation, are followed by a semicolon, then the initials, in alphabetized order, of additional observers submitting documentation, then the CBRC record number consisting of the year of observation and a chronological number assigned by the secretary. All records are sight records unless otherwise indicated by † for an *identifiable* photograph, ‡ for videotape, § for a voice recording, and # for a specimen record, followed by the acronym (see below) of the institution housing the specimen and that institution's specimen catalog number.

An asterisk (*) prior to a species' name indicates that the species is no longer on the CBRC's review list. The first number in parentheses after the species' name is the number of records accepted by the CBRC through this report. The second is the number of new records accepted in this report; because this number excludes records thought to pertain to returning individuals, it may be zero. Two asterisks (**) after the species' total indicate that the number of accepted records refers only to a restricted review period or includes records accepted for statistical purposes only (see Roberson 1986).

When individual birds return to a location after a lengthy or seasonal absence, each occurrence is reviewed under a separate record number and Committee members consider whether or not they believe the bird is the same as one accepted previously. Such decisions follow the opinion of the majority of members and, if a bird is considered a returning individual, the total number of records remains unchanged. Although the CBRC does not formally review the age, sex, or subspecies of each bird, information on these subjects is often provided during the review process (and in some cases a strong or unanimous consensus is achieved). We have tried to report as much of this information as possible.

The CBRC uses standard abbreviations for California counties. Those used in this report are ALA, Alameda; COL, Colusa; DN, Del Norte; HUM, Humboldt; IMP, Imperial; INY, Inyo; KER, Kern; KIN, Kings; LA, Los Angeles; MRN, Marin; MEN, Mendocino; MTY, Monterey; ORA, Orange; PLU, Plumas; RIV, Riverside; SAC, Sacramento; SBE, San Bernardino; SD, San Diego; SF, San Francisco; SLO, San Luis Obispo; SM, San Mateo; SBA, Santa Barbara; SCL, Santa Clara; SCZ, Santa Cruz; SON, Sonoma; STA, Stanislaus; TEH, Tehama; VEN, Ventura. A full list of county abbreviations is available on the CBRC web site. Other abbreviations used: I., island; L., lake; Mt., mountain; n. miles, nautical miles; N.P., national park; Pt., point; R., river; S.P., state park.

Museum collections housing specimens cited in this report, allowing access to Committee members for research, or otherwise cited are the California Academy of Sciences, San Francisco (CAS), Natural History

Museum of Los Angeles County (LACM), Pacific Grove Museum of Natural History (PGMNH), San Diego Natural History Museum (SDNHM), Santa Barbara Museum of Natural History (SBMNH), Museum of Vertebrate Zoology at the University of California, Berkeley (MVZ), University of California, Davis (UCD), and San Bernardino County Museum (SBCM).

RECORDS ACCEPTED

YELLOW-BILLED LOON *Gavia adamsii* (64, 3). One basic-plumaged adult at Albion Field Station, MEN, *29 Apr–4* Jul 1996 (RJK, DTo; 1998-110) was a county first. One at SE Farallon I., SF, 15–16 Dec 1997 (AV; 1998-024) was a first for the island and previously unpublished. An alternate-plumaged adult flew past Pigeon Pt., SM, 24 Apr 1997 (BMcK; FT; 1997-093). A basic-plumaged adult on Monterey Bay 1–2 n. miles off Pt. Joe, MTY, 11 Jan–1 Feb 1997 (SFB, RLB†, DLSh; 1997-077) was believed to be one of up to three individuals wintering at this locality since 1994–1995 (Howell and Pyle 1997). An alternate-plumaged adult off Otter Pt., Monterey Bay, MTY, *30 Oct 1997*–25 Jan 1998 (RLB†, ADeM, DLSh; 1998-052) molted into basic plumage during its stay. It was believed to be the same as one wintering there in juvenal plumage 1993–1994 (McCaskie and San Miguel 1999) and returning the next two winters (Garrett and Singer 1998) but not seen in 1996–1997. A photograph appeared in *Field Notes* 52:119.

GREAT-WINGED PETREL *Pterodroma macroptera* (1, 1). One videotaped at the Cordell Bank, MRN, 21 Jul 1996 (RS; LH, LL‡; 1996-133; previously unpublished) and one photographed N of the Cordell Bank, 24 Aug 1996 (BED, MiF, EDG†, SBT, MW†; 1997-068) were probably the same individual and represent a first for the Northern Hemisphere. Understandably, there was some initial confusion regarding Murphy's Petrel (*P. ultima*), as this is the "expected" dark *Pterodroma* off California. However, photographic documentation in conjunction with written notes indicated that the bird was a Great-winged Petrel. Review by Australian seabird identification expert Tony Palliser supported this identification. Differences of the Great-winged from Murphy's include its larger size, proportionately heavier bill, more uniform coloration, and more lumbering flight. The Great-winged is also similar to Solander's Petrel (*P. solandri*) but lacks the dark hood, contrasting dark "M" across the upperwings, and prominent white flash on the underwings characteristic of Solander's (Bailey et al. 1989). The extent of pale feathering around the bill onto the forehead and throat of this individual is characteristic of the race *gouldi,* which breeds only at North I., New Zealand (*Field Notes* 51:114, Marchant and Higgins 1990). This subspecies disperses northward but had never been documented N of the Tropic of Capricorn before this occurrence. A photograph was published in *Field Notes* 51:114. An additional record from Monterey Bay on 18 Oct 1998 is currently under review.

DARK-RUMPED PETREL *Pterodroma phaeopygia* (6, 1). One at Cordell Bank, MRN, 1 Aug 1997 (PP; MiF, SBT†, JAT; 1997-122; Figure 2) made the second record of this species at this location, the first being 24 Aug 1996 (McCaskie and San Miguel 1999). As with all records thus far, we cannot determine if the endangered Hawaiian (*P. p. sandwichensis*) or the similar nominate subspecies from the Galapagos is involved, although the former seems more likely from the distributional pattern of records in the North Pacific (Howell and Pyle 1997).

MANX SHEARWATER *Puffinus puffinus* (37, 10). One was at 37°39' N, 123°16' W (approx. 12 n. miles WSW of SE Farallon I.), SF, 2 Oct 1997 (SCR; 1997-161). One was at 36°55' N, 122°40' W (SW of Año Nuevo), SM, 13 Sep 1997 (BMcK; 1997-202). One was on Monterey Bay just off the beach in Santa Cruz, SCZ, 16 Apr

Figure 2. Dark-rumped Petrel, *Pterodroma phaeopygia* (1997-122), Cordell Bank, Marin County, 1 Aug 1997. Sixth record for California.

Photo by Scott B. Terrill

1997 (BMcK; 1997-104). Monterey Bay, MTY, records were as follows: 10 Feb 1996 (JM, DR; 1996-036), 10 Aug 1997 (MMR; AB, RHH; 1997-152), 14 Sep 1997 (SFB; 1997-192), 20 Sep 1997 (NBB, MJSM; 1997-168), 27 Sep 1997 (GWL†, GMcC, MMR; 1997-158), and 31 Dec 1997 (RT; 1998-095). One was 7 n. miles SW of Morro Bay, SLO, 19 Jan 1997 (BS; 1997-043). Some of the Monterey Bay sightings, especially the three September 1997 records, may refer to the same individual but are counted as separate records. This species has occurred annually since first detected in the state in 1993 (Erickson and Terrill 1996), and 1997 was the best year yet. However, we do not know if this is a permanent change in status or an anomalous incursion. See also Records Not Accepted below.

WEDGE-RUMPED STORM-PETREL *Oceanodroma tethys* (7, 1). One was at 33° 39′ N, 120° 37′ W (24 n. miles SW of San Miguel I.), SBA (RLP; 1996-114).

MASKED BOOBY *Sula dactylatra* (10, 3). An immature was at 38° 54′ N, 123° 56′ W (approximately 10 n. miles W of Pt. Arena), MEN, 15 Jun 1997 (MFo; 197-130). Another immature was at 33° 51′ N, 120° 51′ W (23 n. miles SW of San Miguel I.), SBA, 16 Jul 1996 (RLP, SS; 1996-115). A near-adult at Pt. Mugu Naval Station, VEN, 18 Jan–18 Feb 1997 (MFr, NF; DDesJ†, MFe, KLG, DGu†, MTH, GHi, TJH, RLCL, RL, GMcC, JM, MAP, MSM, JAT, WW, JOZ; 1997-007) showed characters of one of the yellow-billed forms, *S. d. californica* or *S. d. personata*, as have all prior California adults. A photograph is in *Field Notes* 51:801. Immature birds are more difficult to identify to subspecies. The Mendocino County bird had a pale yellowish bill and broad cervical collar indicating *californica/personata* (Roberson 1998). The Santa Barbara County bird lacked a cervical collar and its bill color was not determined, making racial determination impossible. Pitman and Jehl (1998) recommended recognizing the smaller orange-billed form of the Galapagos and Malpelo islands, which breeds sympatrically with *S. d. personata* on Clipperton and the Revillagigedo islands, as a full species, the Nazca Booby (*S. granti*). Roberson (1998) concluded that all adults and subadults reaching California have been Masked Boobies, but three April juveniles may have been Nazca Boobies. If the AOU were to adopt the proposed split, the Committee would reconsider all accepted Masked Booby records.

Common Black-Hawk
28 March 1997
California; Riverside County; Oasis
north end of the Salton Sea
0930-0955 PDT
clear; calm; ~75-80°F
optics: Zeiss 10x40B binoculars
Bausch and Lomb 77mm telescope @ 20-25x
observation distance: varied from 30m to 250m
Buteogallus anthracinus
adult plumage
wingspan and length of Red-tailed Hawk (in direct comparison)
broad wings
flapped rapidly, but usually soared
coal-black plumage
thin white tip
yellow cere and bare skin around eye
tail looked short
flew with wings held flat
generally held tail spread
single wide white tail band
whitish at base of outer two primaries
broad black trailing edge
long yellow legs
secondaries dark gray; barred with black
call a high-pitched, whistled, "wheep wheep wheep wep wep"
no white on thighs or rump
tail band clean white above
no chestnut in primaries. If noted none in the secondaries as well
tail held rather bowed when viewed from behind the bird
observer:
Michael A. Patten
28-30 March 1997 (sketch made)
also observed by Brenda D. Smith

Figure 3. Common Black-Hawk, *Buteogallus anthracinus* (1997-070), Oasis, N end of Salton Sea, Riverside County, 28 Mar 1997. Second California record; one of very few species accepted for the state without photographic or specimen documentation.

Sketch by Michael A. Patten

BLUE-FOOTED BOOBY *Sula nebouxii* (80**, 1). A subadult female was at Johnson's Landing, Salton City, IMP, 29 Nov 1997 (MBS†; 1998-028). An immature at Mullet I., S end of Salton Sea, IMP, 14 Feb 1997 (KCM†; 1997-087), and later found near death on the nearby shore 1 Mar 1997, was judged to be one of the three or four individuals that arrived at the Salton Sea beginning 1 Sep 1996 (McCaskie and San Miguel 1999).

BROWN BOOBY *Sula leucogaster* (51, 4). A photo of an immature on Monterey Bay, MTY, 5 Oct 1997 (RLB†, DCu†, JD‡, ADeM†, DLSh; 1998-053) was published in *Field Notes* 52:120. An adult at Diablo Canyon, SLO, 10–*26* Jul 1996 (TME, JSR†; 116-1996) was a first for the county. An immature between Santa Cruz I. and Santa Rosa I., SBA, 19 Oct 1997 (HC†, DDesJ†; 1998-006) was originally thought by some observers to be a Red-footed Booby (*S. sula*), but the photographs (e.g., *Field Notes* 52:144) confirmed it was actually an immature Brown. Observers are cautioned against placing too much reliance on apparent foot color because vascularization may make feet appear red when backlit. An immature was near Niland, IMP, 28 Aug 1996 (GMcC; LJRB†, KZK†; 1996-111).

TRICOLORED HERON *Egretta tricolor* (25**, 4). One immature at Seal Beach, ORA, 27 Sep 1997 (JFt†, CL; 1997-167) was judged to be the same individual as an immature at nearby Bolsa Chica, ORA, 20 Sep 1997–26 Apr 1998 (CAM, GMcC, DR, MSM†, DGS; 1998-004). Another immature was at the Tijuana R. mouth, SD, 3 Nov 1997–*17 Jan* 1998 (PEL, GMcC, DGS, DSg†; 1997-184). An adult was at the mouth of the Whitewater R., N end of Salton Sea, RIV, 3–6 May 1997 (GMcC; 1997-082), while another adult was at Obsidian Butte, S end of Salton Sea, IMP, 3 May 1997 (GMcC; 1997-083).

REDDISH EGRET *Egretta rufescens* (75, 1). An adult at Bolsa Chica, ORA, 24 Apr–11 May 1997 (GMcC; 1997-088) was believed to be one of three adults there in

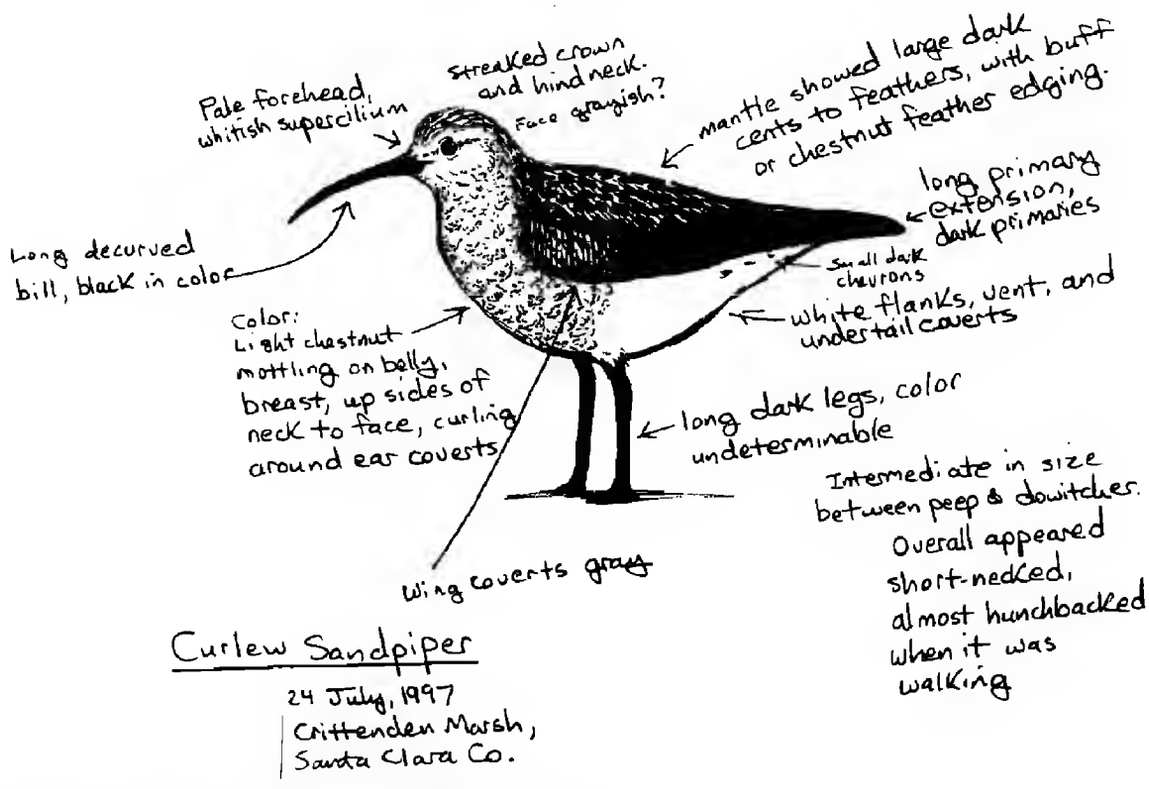
Pale forehead, whitish supercilium
streaked crown and hind neck. Face grayish?
mantle showed large dark centers to feathers, with buff or chestnut feather edging.
long primary extension, dark primaries
Long decurved bill, black in color
small dark chevrons
white flanks, vent, and undertail coverts
Color: Light chestnut mottling on belly, breast, up sides of neck to face, curling around ear coverts
long dark legs, color undeterminable
Intermediate in size between peep & dowitchers. Overall appeared short-necked, almost hunchbacked when it was walking
wing coverts gray
Curlew Sandpiper
24 July, 1997
Crittenden Marsh, Santa Clara Co.

Figure 4. Curlew Sandpiper, *Calidris ferruginea* (1997-121), Mountain View, Santa Clara County, 24 Jul 1997.

Sketch by John Mariani

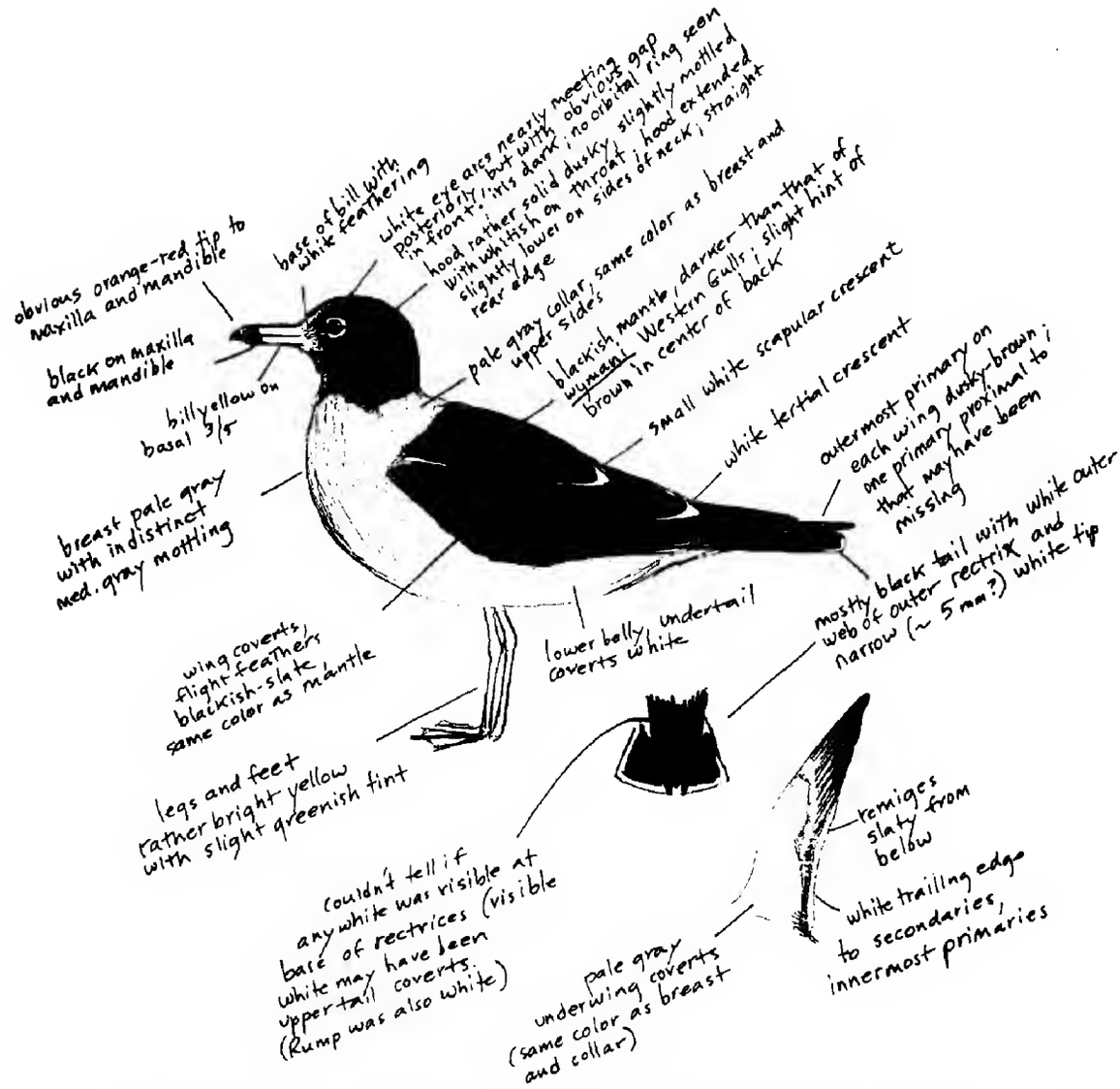
obvious orange-red tip to maxilla and mandible
base of bill with white feathering
white eye arcs nearly meeting gap posteriorly, but with obvious gap in front; iris dark; no orbital ring seen
hood rather solid dusky with whitish on throat; slightly mottled slightly lower on sides of neck; straight rear edge; hood extended
pale gray collar, same color as breast and upper sides
blackish mantle, darker than that of Wyman's Western Gulls; slight hint of brown in center of back
small white scapular crescent
white tertial crescent
outermost primary on each wing dusky-brown; one primary proximal to that may have been missing
mostly black tail with white outer web of outer rectrix and narrow (~ 5 mm?) white tip
black on maxilla and mandible
bill yellow on basal 3/5
breast pale gray with indistinct med. gray mottling
wing coverts, flight feathers blackish-slate same color as mantle
lower belly, undertail coverts white
legs and feet rather bright yellow with slight greenish tint
couldn't tell if any white was visible at base of rectrices (visible white may have been upper tail coverts. (Rump was also white)
pale gray underwing coverts (same color as breast and collar)
remiges slaty from below
white trailing edge to secondaries, innermost primaries

Figure 5. Band-tailed Gull, *Larus belcheri* (1997-20), at the Tijuana River mouth, Imperial Beach, San Diego County, 10 Aug 1997. First accepted California record.

Sketch by Kimball L. Garrett

1996 (McCaskie and San Miguel 1999). No details have been received for a second bird reported there 30 Apr–2 May 1997 (*Field Notes* 51:927). One immature at Salton City, IMP, 16–31 Aug 1997 (GMcC; LC†, JMt, CMcG†, BMcK, JM, MAP, SCR, DSt; 1997-125) was inland on the Salton Sea, where there are only seven prior records. One returning adult with a slightly deformed bill at Imperial Beach, SD, 7 Aug–20 Dec 1997 (MMR; MiF, KLG, GMcC; 1997-134) was the same individual that has spent each winter since 18 Dec 1982 at the Tijuana R. mouth and on S San Diego Bay (Roberson 1986, McCaskie and San Miguel 1999). It was thus at least 15 years old, exceeding the previously published longevity record of 12 years, 3 months (Clapp et al. 1982).

YELLOW-CROWNED NIGHT-HERON *Nyctanassa violacea* (18, 0). An adult returned to La Jolla, SD, 1 Mar–3 May 1997 (AME; GMcC; 1997-065), where it has attempted to nest with Black-crowned Night-Herons (*N. nycticorax*) since first found in October 1981 (Binford 1985, Erickson and Terrill 1996, McCaskie and San Miguel 1999). The published longevity record for this species is 6 years, 3 months (Klimkiewicz and Futcher 1997). However, the longer-staying La Jolla individual does not constitute a new formal longevity record because it was not individually marked and thus only assumed to be the same bird (Klimkiewicz pers. comm.)

TRUMPETER SWAN *Cygnus buccinator* (22, 1). One adult without a neck collar was near Grimes, COL, 4 Jan 1996 (JM; VH; 1996-037). An immature seen the same day and at the same location was not accepted. See Records Not Accepted.

GARGANEY *Anas querquedula* (20, 1). An alternate-plumaged male at Tulare L. Drainage District, KIN, 17 Apr 1993 (GWP; 1999-031) was previously unpublished and constituted the first record for the county. The documentation and field sketches prepared at the time were not submitted until nearly 6 years later because the observer was under the impression that single-observer sightings were never accepted. In fact, this bird was endorsed unanimously on the first circulation with many members commenting on the excellence of the documentation.

COMMON BLACK-HAWK *Buteogallus anthracinus* (2,1). An adult was at Oasis, N end of Salton Sea, RIV, 28 Mar–2 May 1997 (MAP, BDS; PAG, GMcC, DGS; 1997-070; Figure 3). An adult at nearby Thousand Palms Oasis, RIV, 13 Apr 1985, is the only other previously accepted in California (Daniels et. al 1989). This species has been recorded in spring from the lower Colorado River (Rosenberg et al. 1991). A report from northern Baja California (Short and Crossin 1967) has been questioned by Howell and Webb (1995).

*ZONE-TAILED HAWK *Buteo albonotatus* (51, 5). One adult (not an immature as stated in *Field Notes* 52:125) at San Luis Obispo, SLO, 14 Oct 1997 (JSR; 1998-030) was the first accepted for that county and the northernmost ever recorded along California's coastal slope. A molting juvenile (photograph in *Field Notes* 51:927) was at Furnace Creek Ranch, Death Valley, INY, 24–25 May 1997 (MAP; JH, THt, SBT; 1997-096). One adult returned to Goleta, SBA, 29 Sep 1997–14 Mar 1998 (DVB,

Figure 6. Immature male Broad-billed Hummingbird, *Cynanthus latirostris* (1997-209), Weldon, Kern County, 2 Oct 1997.

Photo by Matthew T. Heindel

Figure 7. Blue Jay, *Cyanocitta cristata* (1997-191), Willow Creek, Humboldt County, 14 Dec 1997.

Photo by Ron LeValley

CAM; 1997-177) where it has been seen each winter since Dec 1993 (Erickson and Terrill 1996). One at Ventura, VEN, 17 Dec 1995–8 Mar 1996 (DM; 49-1995) may have been the same bird returning to the Ojai–Ventura area each winter since 1993–94 (Erickson and Terrill 1996). See also Records Not Accepted below. It may also have been the same as one at Ojai, VEN, 3 Dec 1997 (WW; 1997-183). One at Rancho Mission Viejo Land Conservancy, ORA, 20 Dec 1997 (RFi; 1998-058) was in an area where small numbers occur regularly every fall and winter, but it is counted as a new individual. One returned to the San Diego Wild Animal Park, Escondido, SD, 28 Sep 1997–16 Apr 1998 (PU; GEC, TRC, GMcC; 1997-186), and an adult was at Pine Valley, SD, 17 Feb 1997 (MAP; 1997-063).

YELLOW RAIL *Coturnicops novebocensis* (68, 1). An adult male found alive under a car during a stormy night in Santa Barbara, SBA, 12 Nov 1996 (#SBMNH 6629; KW, 1998-178) was taken to the Santa Barbara Wildlife Care Network where it died the next day. It constitutes the first record for Santa Barbara County (Lehman 1994).

PURPLE GALLINULE *Porphyrula martinica* (3, 1). One at Furnace Creek Ranch, Death Valley, INY, 23 Sep–12 Nov 1997 (JLD; MiF, KLG†, EDG†, JHn†, TH, GMcC, JN†, MAP, DR†, MMR†, MJSM, MSM†, LSa†, DGS, JOZ; 1997-151) was a first for the county and the first adult or near adult for the state. A photograph was published in *Field Notes* 52:125.

AMERICAN OYSTERCATCHER *Haematopus palliatus* (15, 2). One was at the E end of San Nicolas I., VEN, 30 Apr–16 Jun 1996 (GeM, TAS, WW†; 1996-106), and another was at the NW end of the island 15 Jun 1996 (GeM; 1997-012). The birds appeared to be of the expected W Mexican subspecies *H. p. frazari* but were too distant for any attempt to assess possible hybridization with the Black Oystercatcher (*H. bachmani*) on the basis of Jehl's (1985) index. Jehl's scoring system is helpful in analyzing specimens, but many of the index characters cannot easily be determined in the field. See Heindel and Patten (1996) and Erickson and Terrill (1996). See also Records Not Accepted below.

UPLAND SANDPIPER *Bartramia longicauda* (15, 1). One was at the Salinas commercial ponds, MTY, 12 Sep 1997 (BHG; 1997-155).

HUDSONIAN GODWIT *Limosa haemastica* (15, 1). A color photograph of a juvenile at the Eel River Wildlife Area, HUM, 9–10 Sep 1997 (SMcA†; RJA, DFx; 1997-148) was published in *Field Notes* 52:142.

BAR-TAILED GODWIT *Limosa lapponica*. (21, 2) One juvenile at the Eel River Wildlife Area, HUM, 4–12 Sep 1997 (SMcA†; 1998-029) was photographed in the same field of view as the Hudsonian Godwit above. A color photograph was published in *Field Notes* 52:142, but no written documentation was received and the subspecies could not be determined. Further details, including documentation for a claim of up to three Bar-tailed Godwits reportedly seen there on 12 Sep 1997, would be most welcome. A photograph of another juvenile at San Gregorio State Beach, SM (31 Aug 1997; DSg†; JM, JMt; 1997-129) was published in *Field Notes* 52:121. It showed characters of the expected Siberian subspecies *L. l. baueri*.

WHITE-RUMPED SANDPIPER *Calidris fuscicollis* (14, 1). One adult in prebasic molt was at the Coyote Creek Riparian Station, Alviso, SCL, 3–5 Sep 1997 (NL; LC, AME, MiF, MM, JM, RJR, MMR, SCR, DGS, SBT; 1997-127).

CURLEW SANDPIPER *Calidris ferruginea* (23, 2). One in near-alternate plumage was at the Palo Alto Baylands, SCL, 17 Apr 1997 (SCR†; 1997-098). An adult was at Mountain View, SCL, 23 Jul–15 Aug 1997 (MMR; MiF, MM, JSM, JM, DR, SCR, SBT; 1997-121; Figure 4).

LITTLE GULL *Larus minutus* (68, 2). One adult molting into basic plumage at China L., KER, 29 Aug–1 Sep 1997 (MTH; 1997-126) was the second to be found in the desert portion of the county. An immature molting from first alternate to adult basic plumage was at the S end of Salton Sea, IMP, 31 May–24 Aug 1997 (GMcC; 1997-094), where the species is now of annual occurrence.

BAND-TAILED GULL *Larus belcheri* (1, 1). One adult at the Tijuana River mouth, Imperial Beach, SD, 3 Aug 1997–2 Jan 1998 (DGS; KB, TRC, BC, GE†, MFe†, KLG, SKm, RL, JMt, GMcC, JM, KM†, MAP, RWR, DR†, GLR, MMR, SCR, MSM, RMS†, LSa†, JKS, DSt, DT, PU, JOZ; 1997-20; Figure 5) was a first for California and possibly for the United States. The bird appeared to be molting from second alternate into basic plumage. This species normally ranges along the Pacific coast of South America from Peru to northern Chile, but vagrants have been reported from Panama (AOU 1998) to Las Cruces, central Chile (Sallaberry et al. 1992) and even the Falkland Islands (Woods 1988). Stevenson et al. (1980) cited four Florida reports, which have been variously treated as acceptable (Robertson and Woolfenden 1992) or of questionable natural occurrence (AOU 1998, ABA 1996). A previous report from California at San Nicolas I., VEN, in the winter of 1987–1988 that failed to gain acceptance by a narrow vote (Heindel and Garrett 1995) is currently being reconsidered. See Patten (1998) for further discussion of this and other southern gulls in North America. Color photographs of the San Diego bird were published in *Field Notes* 51:1062 and *Birding* 31:63, and a black-and-white photo appears in *Field Notes*

51:1053. The Band-tailed Gull may be distinguished from the similar Olrog's Gull (*L. atlanticus*) of Atlantic South America by its smaller size, broader black tail-band, slimmer bill, darker breast, and darker head in winter plumage. For futher information on identification and distribution see Lethaby and Bangma (1999).

LESSER BLACK-BACKED GULL *Larus fuscus* (9, 0). One adult at Alviso, SCL, 25 Dec 1996–22 Feb 1997 (MJM, SCR†; 1997-002) was considered the same bird returning from the previous year (Garrett and Singer 1998) and, like all previous California Lesser Black-backed Gulls, showed characteristics of the pale race *L. g. graellsii*. It is difficult to distinguish *L. f. graellsii* from "Heuglin's Gull," which has been variously regarded as a race of the Herring Gull (*L. argentatus heuglini*), Siberian Gull (*L. [a.] taimyrensis*), Yellow-legged Gull (*L. cachinnans*), Lesser Black-backed, or even a separate species, Heuglin's Gull (*L. heuglini*) (summary in Madge 1996). The identification of Heuglin's Gull is not yet fully resolved (Eskelin and Pursiainen 1998). If more information becomes available, the Committee may need to reassess past California records of the Lesser Black-backed Gull. Heuglin's Gull breeds in NE Europe and as yet there is no definitive evidence that it has reached North America, while the Lesser Black-backed is becoming more common each year in North America and appears to be spreading west.

SWALLOW-TAILED GULL *Creagrus furcatus* (2, 1). An adult at Pacific Grove and nearby Moss Landing, MTY, 6–8 Jun 1985 (AB; ADB, RAE, ASH†, JML, PLaT†, MJL, GMcC, JM, GN†, DR, REW†; 1985-079) was originally judged by the Committee to be of questionable natural occurrence (Heindel and Garrett 1995), and placed on the supplemental list. However, acceptance of another adult Swallow-tailed Gull approximately 15 n. miles W of SE Farallon I., SF, 3 Mar 1996 (McCaskie and San Miguel 1999) prompted reconsideration of the 1985 bird, which was then accepted unanimously on its first recirculation. This species has been reported N to Panama (Ridgely and Gwynne 1989, Reed 1988) and S to central Chile (Jehl 1973). It is possible that the 1985 record was related to the lingering effects of the 1982–83 El Niño. During the peak of this El Niño, all Swallow-tailed Gulls appeared to have left the Peru Current (Arntz 1986, cf. Veit 1985). This record was reviewed by the ABA Checklist Committee and not accepted on grounds of questionable natural occurrence (DeBenedictis 1996). The AOU (1998) placed the species in an appendix, stating "the origin of the bird is uncertain." Black-and-white photographs were published in *Am. Birds* 39:958, and color photos appear in Roberson (1985).

SANDWICH TERN *Sterna sandvicensis* (3, 0). A color photograph of an adult at Bolsa Chica, ORA, 11 May–17 Jul 1997 (RL, LSa†;1997-100) was published in *Field Notes* 51:937. It was judged to be the same bird returning to the Elegant Tern (*S. elegans*) colony off and on since 1991 (Patten et al. 1995). Three photographs of this bird showing it defending a nest and a presumed hybrid Sandwich × Elegant tern chick appear in Collins (1997).

SOOTY TERN *Sterna fuscata* (6, 0). An adult at Bolsa Chica, ORA, 26 Mar–26 Jul 1997 (CJE, MFe, GMcC, MAP, RWR, LSa†, DGS; 1997-089) was considered the same bird seen at the Elegant Tern colony off and on since 1994 (Erickson and Terrill 1996). A color photograph is in *Field Notes* 51:937. See also Records Not Accepted below.

LONG-BILLED MURRELET *Brachyramphus perdix* (2, 2). One in basic plumage offshore from Damnation Creek, DN, 26 Aug 1994 (CS†; 1999-060) was previously noted by Harris (1996) and Mlodinow (1997). A photograph of one in basic plumage at Pirates Cove, Muir Beach, MRN, 27 Dec 1997 (ASH†; 1998-011) was published in *Field Notes* 52:253. These are the first records of this species to be accepted by the Committee, although at least eight additional records going back to 1981 have not yet been reviewed. These include four specimens from Mono Lake (Jehl and Jehl 1981,

Figure 8. Dusky Warbler, *Phylloscopus fuscatus* (1997-174), Palomarin Field Station, Point Reyes Bird Observatory, Marin County, 18 Oct 1997. Although the supercilium may be fainter in the supraloral area than is typical of this species, the small bill and narrow whitish supercilium (as well as the call) helped to eliminate similar species such as the Radde's (*P. schwarzi*) and Yellow-streaked (*P. armandii*) warblers, yet to be recorded in North America.

Photo by Steve N. G. Howell

Sealy et al. 1991) as well as three records from Humboldt County (Mlodinow 1997) and one from Mendocino County. The Committee intends to review all of these past records. This species was recently split from the Marbled Murrelet (*B. marmoratus*) (Friesen et al. 1996, Patten 1997, AOU 1998). Most North American records are of fall vagrants inland across North America (Sealy et al. 1982, 1991, Mlodinow 1997), but the two California records accepted here are coastal. For information on field identification see Sibley (1993), Erickson et al. (1995), and Mlodinow (1997).

PARAKEET AUKLET *Aethia psittacula* (68, 2). One was near 37°51'N, 123°26' W (21 n. miles SW of Pt. Reyes), MRN, 12 Sep 1997 (SCR; 1997-201). Another was at San Nicolas I., VEN, 1 Feb 1997 (MTH, WW; 1997-066). Beck (1910) encountered large numbers in Monterey Bay in January 1905 and 1908, but few have been found close to shore in recent years. Instead, this species has been found to be somewhat regular in deep water well offshore in winter.

RUDDY GROUND-DOVE *Columbina talpacoti* (66, 2). Single males were at the Iron Mt. Pumping Plant, SBE, 30 Oct 1996 (EAC†; 1997-017) and in the Tijuana R. valley, SD, 18 Oct 1997 (GMcC; 1997-185). The vast majority of accepted records are from the desert interior; coastally, six of eight records are from the Tijuana R. valley.

BROAD-BILLED HUMMINGBIRD *Cynanthus latirostris* (52, 2). An immature male was at Weldon, KER, 1–4 Oct 1997 (MTH†, JCW†; 1997-209; Figure 6), and an adult male was in the Tijuana R. valley, SD, 5–8 Oct 1997 (CGE, GMcC; 1997-162).

Figure 9. Immature Mourning Warbler, *Oporornis philadelphia* (1997-157), Exposition Park, Los Angeles, Los Angeles County, 25 Sep 1997.

Photo by Kimball L. Garrett

YELLOW-BELLIED FLYCATCHER *Empidonax flaviventris* (11, 4). Single individuals were at Galileo Hill, KER, 11 Sep 1996 (JLD, MO'B; 1997-019) and 21 Sep 1997 (MTH†; 1997-207). Another was near Cantil, KER, 24 Sep 1997 (MTH†; 1997-208), and a first-year bird (probably a male from measurements) was banded at SE Farallon I., SF, 10 Sep 1997 (GP; PP†; 1997-198). All but two accepted records are from SE Farallon I. (five) or Kern County (four).

Sightings of this species are always treated with caution. Although neither of the two 1997 birds in Kern County was heard vocalizing, detailed study of these birds by a knowledgeable observer and extremely close photos allowed similar species to be eliminated. Heindel and Pyle (1999) covered the identification of the Western (*E. difficilis*) and Yellow-bellied Flycatchers in the field and included color photos of all three of the individuals recorded in 1997; another photo of the 1997 Galileo Hill bird was published in *Field Notes* 52:126. With prolonged excellent views, observers experienced with these species may be able to distinguish even silent Yellow-bellied Flycatchers from their congeners in the field. Photos, however, are often necessary for some characters (e.g., primary spacing) to be evaluated adequately.

DUSKY-CAPPED FLYCATCHER *Myiarchus tuberculifer* (45, 7). One was on Pt. Loma, SD, 12 Apr–1 May 1997 (PAG; GMcC; 1997-078). There are no records of presumed spring migrants or "overshoots" in California, as all previous records in

April or May were known to involve overwintering birds. Given that the bird was present for at least two weeks and that an unidentified *Myiarchus* was seen at this location on 19 Jan 1997, the bird probably overwintered locally. More expected fall and winter birds were in Bishop, INY, 7–*11* Nov 1997 (DbP; JH†, TH; 1997-205), Corona del Mar, ORA, 16 Nov 1997 (JEP; TEW; 1998-018), Half Moon Bay, SM, 1 Dec 1997 (RST; BMcK†; 1997-212), Santa Cruz, SCZ, 9 Dec 1997–14 Mar 1998 (SGe; JM, JDP; 1998-062), Lake Merced, SF, *21*–30 Dec 1997 (PJM; 1998-092), and Lake Forest, ORA, 21 Dec 1997–24 Jan 1998 (TEW; 1998-066). Narrow rusty edging at the bases of the outer webs of the rectrices, typically present on Dusky-capped Flycatchers that have been observed in the state (Patten and Erickson 1994, Erickson and Terrill 1996), was noted on all but the Pt. Loma bird. This rusty edging is typical of juvenile (but not adult) *M. t. olivascens*, the race that has been collected in the state (Roberson 1986) and that is geographically closest to California (Howell and Webb 1995, Pyle 1997).

SULPHUR-BELLIED FLYCATCHER *Myiodynastes luteiventris* (12, 1). One at Bodega Bay, SON, *27–29* Sep 1997 (DMM; AME, KH, LL, JMt, JM, BDP, MMR†; 1997-138) gave northern California its third accepted record (the previous two having been in Marin County) and the northernmost ever recorded on the West Coast. The apparent lack of a yellow crown patch, noted by several observers, suggested an immature. Photos and descriptions eliminated the similar Streaked Flycatcher (*M. maculatus*) of Central and South America (see Howell and Webb 1995). This bird had an extensive pale base to the lower mandible, a character thought by some to be more typical of *maculatus* (Howell and Webb 1995, Pyle 1997), although it may be of limited use in identification of immatures (Roberson 1986, S. N. G. Howell pers. comm.).

COUCH'S KINGBIRD *Tyrannus couchii* (1, 1). California's first was in Fullerton, ORA, 31 Dec 1997–21 Feb 1998 (JHr, JEP§; CA, CB, TRC, MiF, SRG§, KLG, KGi§, MTH, RL, MJM, CAM, GMcC, JM, MAP, RWR, DR†, MMR†, MSM†, DGS, JWe†, TEW, JOZ§; 1998-001); photos appeared in *Field Notes* 52:258, 270. On the basis of its rounded primary tips and buff edging on the uppertail coverts, the bird was thought to be a first-year individual (Pyle 1997). Understandably reported as a Tropical Kingbird (*T. melancholicus*) initially, this bird was correctly identified as a Couch's by its distinctive vocalizations. The most common call was a repeated "*kip*" or "*keep*", although the species' rolling "*breer*" and other calls were given occasionally. All these calls were very different from the staccato twittering typical of the Tropical Kingbird, and these differences are reliable in distinguishing the two species (Phillips 1994). Some observers noted a somewhat shorter bill and brighter olive upperparts than are shown by most Tropical Kingbirds. Although these features support the identification as Couch's, neither is diagnostic in itself, and the conclusive field identification of birds within this species pair relies on vocalizations.

The Couch's Kingbird breeds no closer to California than southern Texas and eastern Mexico. It is not a long-distance migrant, but at least some populations show seasonal movements (Howell and Webb 1995). The only previous records of vagrancy in the United States W of Texas were of single birds in New Mexico 23–30 Sep 1985 (*Am. Birds* 40:153) and 24 Feb–10 Apr 1998 (*Field Notes* 52:370). Birders observing silent Tropical/Couch's Kingbirds in California are encouraged to use taped calls in an attempt to elicit a response from, and positively identify, such birds; the Fullerton bird responded aggressively to commercial Couch's Kingbird recordings. Incidentally, a bird collected at Harper Dry Lake, SBE, 27 Sep 1990 (*Am. Birds* 45:153) was thought perhaps to be a Couch's Kingbird, but the specimen was identified by Melvin Traylor, Steven W. Cardiff, and J. V. Remsen, Jr., as a Tropical (Patten, in comments).

THICK-BILLED KINGBIRD *Tyrannus crassirostris* (13, 1). One at Pomona, LA,

30 Oct 1997–21 Feb 1998 (TEW; TPB, TRC, JGr, GMcC, RWR, DR, MSM, DSt, SW; 1997-203) returned for its sixth consecutive winter at this location. On 14 Jan 1997, the previous winter, it was joined by a second individual (TPB, SW; 1996-157A). Some members were initially concerned about the second individual because it was observed on only one date, whereas the first bird was seen throughout the winter. However, the descriptions of the second bird on 14 Jan 1997 were diagnostic for this species, and another birder was rumored to have seen two Thick-billed Kingbirds together at this location in November 1996.

*SCISSOR-TAILED FLYCATCHER *Tyrannus forficatus* (100, 3). A probable adult male was at Long Beach, LA, 19 Jan–22 Feb 1997 (JFt†, JMt, JM, SN, MAP†, RWR, MSM†, SBT; 1997-062), a previously unpublished individual was at San Clemente I., LA, 29 Apr 1997 (JMr; 1997-080), and an apparent first-winter female was at Murrieta, RIV, 14 Dec 1997–2 Jan 1998 (TRC, MiF, CH‡, WKL†, GMcC, MAP, CER; 1997-200). This species has been recorded in the state during every month of the year, and it has even nested (hybridizing with a Western Kingbird) at Needles, SBE, in 1979 and 1983 (Bevier 1990, Rosenberg et al. 1991). The Committee will not review records after 1997.

WHITE-EYED VIREO *Vireo griseus* (36, 2). A singing male near Cantil, KER, 26 May 1997 (MTH†; 1997-110) was Kern's fifth (all in spring); a color photo appeared in *Field Notes* 51:938. A singing male in Modesto, STA, 1 Jun 1997 (HMR; JGa; 1998-166) provided the first record for the Central Valley and the only inland record for northern California outside Mono County, which has three records. Approximately 75% of accepted records are from spring (8 May to late June).

YELLOW-THROATED VIREO *Vireo flavifrons* (67, 4). A singing male was at Westminster, ORA, 29–30 May 1997 (RAE, RL; 1997-101), and individuals of unknown sex were at Westhaven, HUM, 27 Sep–1 Oct 1996 (GjH, TL; 1997-053), Redondo Beach, LA, 18 May 1997 (IH; 1997-123; previously unpublished), and the Prado Basin, RIV, 10 Sep 1997 (JEP; 1998-017).

*PHILADELPHIA VIREO *Vireo philadelphicus* (108, 5). Individuals NW of Ferndale, HUM, 2 Oct 1996 (SMcA†; 1997-052) and at Montaña de Oro S.P., SLO, 10 Oct 1996 (JMC; 1997-021), N. Haiwee Reservoir, INY, 15 Oct 1996 (JH, TH; 1997-020), and Carpinteria Creek, SBA, 27 Sep–4 Oct 1997 (BS; MSM, TEW; 1997-141) fit the species' predominant pattern of vagrancy (brief stopovers in late September and early October). One at Irvine, ORA, 24 Oct–14 Dec 1997 (JEP; NBB, RL, MJSM, MSM, TEW; 1997-180), however, was unusual both for the length of its stay and for remaining into December. Previous December records at Harbor L., LA, 30 Dec 1978–12 Jan 1979 (Luther et al. 1983) and Huntington Beach, ORA, 26 Nov 1982–1 Jan 1983 (Morlan 1985) were likely of individuals attempting to overwinter, and the Irvine bird may have been doing the same. The only Philadelphia Vireo known to have overwintered in the state was in Goleta, SBA, 14 Feb–17 Mar 1992 (Heindel and Patten 1996). The number of accepted records indicates that this species is a regular, though rare, component of California's avifauna, and records after 1998 will not be reviewed.

YELLOW-GREEN VIREO *Vireo flavoviridis* (55, 7). The first inland record for northern California was provided by an individual at the Cosumnes R. Preserve, SAC, 2 Oct 1994 (JML, JAT; 1994-142). This record met resistance because of concerns about elements of the description and the lack of any previous records from this part of the state, but in the fourth round all but one member voted to accept. Presumably different individuals on the Oxnard Plain, VEN, were at Hueneme Road 20–22 Sep 1997 (TEW; 1998-067) and Laguna Road 27–30 Sep 1997 (TEW; NBB, GMcC; 1997-159). Others were at Huntington Beach, ORA, 20 Sep 1996 (CAM, JEP; 1996-171), Pt. Reyes, MRN, 7–8 Oct 1996 (GHF, JMR; 1997-050), Pescadero, SM,

25–*28* Sep 1997 (BMcK†, FT; JM; 1997-139), and the N jetty of Humboldt Bay, HUM, 14–18 Oct 1997 (DFx; 1997-149). All seven were described as having brown or dark eyes, indicating first-fall birds. Although the age of every Yellow-green Vireo in the state has not been determined, the only obvious adult (as indicated by plumage and a bright red eye, depicted in Pyle and McCaskie 1992) was at Pt. Reyes, MRN, 30 Sep 1988.

BLUE JAY *Cyanocitta cristata* (11, 1). One at Willow Creek, HUM, 2 Dec 1997 to about 7 Mar 1998 (BB; MiF, RLeV†, MMR , DGS; 1997-191; Figure 7) was in its first year, as indicated by the lack of dark barring on the exposed alula in the photo submitted (Pyle 1997). Six of the last seven accepted records have been along the coast from Sonoma County north.

SEDGE WREN *Cistothorus platensis* (5, 1). Southern California's second was at Pt. Mugu, VEN, 26–27 Oct 1997 (CVP, DVP; NBB, GMcC, MSM†, LSa†, SS; 1997-171). The only previous record for the southern part of the state was from Huntington Beach, ORA, 15–17 Oct 1991 (Patten et al. 1995). Although the Pt. Mugu bird was reportedly observed 28 Oct, it was not seen by most of the birders searching on that date, and a majority of members worried about confusion with a buffy Marsh Wren (*C. palustris*) present then. A photo of this bird was published in *Field Notes* 52:127.

DUSKY WARBLER *Phylloscopus fuscatus* (9, 4). An unprecedented influx brought four to California in October 1997, nearly doubling the number of state records. The first was 10 miles NNW of California City, KER, 4–5 Oct 1997 (MTH†; DVB, GMcC, MSM, JCW†; 1997-143); a color photo of this bird appeared in *Field Notes* 52:140. Two in Santa Cruz, SCZ, one at Antonelli Pond *13*–22 Oct 1997 (SGe, DR; KB, LC†, JCo, BED, AME, MiF, RFo, SH, LL‡, BMcK†, JM, DS, JAT; 1997-166) and another nearby at Bethany Curve Parkway 24 Oct 1997 (SGe; 1997-181), were thought to be different individuals by a majority of members. Although the birds were not seen concurrently, the 1.5-mile separation of these two locations, coupled with the obvious influx of Dusky Warblers at the time, led most Committee members to conclude that these were different individuals. A photo of the Antonelli Pond individual appeared in *Field Notes* 52:123. Another was banded at Palomarin, MRN, 18–19 Oct 1997 (SNGH†; 1997-174; Figure 8). The significant movement of this species to the west coast during the fall of 1997 also brought two to Alaska (at Gambell and Middleton I.), the first for that state in 10 years (*Field Notes* 52:1079–110). The only Dusky Warblers found in the Americas outside Alaska and California have been in Baja California, where single birds were recorded 15 Oct 1991 near Maneadero and 20–23 Oct 1995 at Cataviña (Howell and Webb 1995, *Field Notes* 50:116). Although the Dusky and Arctic (*P. borealis*) warblers are the only species of *Phylloscopus* that have been recorded in California, other Asian species could occur as vagrants, and any *Phylloscopus* seen in the state should be described in detail. The identification of Dusky Warbler vis-à-vis similar species was discussed by Erickson and Terrill (1996); see also Lewington et al. (1991), Jonsson (1993), and Leader (1995).

NORTHERN WHEATEAR *Oenanthe oenanthe* (10, 1). A female or immature at Bodega Bay, SON, 26 Sep 1995 (LSp, SSp†;1995-116) was initially documented only by two photographs and information on the date, location, and observers (a written description was added after the third round). All members agreed that the bird was a wheatear, with Northern being by far the most probable. The Isabelline (*O. isabellina*) and Black-eared (*O. hispanica*) wheatears can appear similar to the Northern in some plumages and have been recorded as vagrants in western Europe (Clement 1987), but no wheatears other than the Northern have been recorded in North America (AOU 1998). Through the first three rounds of voting, opinions were split among three camps: those who thought the photos eliminated species other than the Northern, those who thought the photos might not eliminate other species but who were willing to accept the bird as a Northern on the basis of probability of

occurrence, and those who thought the photos did not eliminate other species and who were unwilling to accept the bird as a Northern primarily on probability. Eventually, the reasons why other wheatears could be eliminated were discussed in detail, and the record was accepted unanimously in the fourth round.

This record highlights a philosophical difference in the approach of Committee members when evaluating records likely of one species from its previous history of occurrence but that may not eliminate other, much less probable species. For example, some members are willing to accept records of the King Eider (*Somateria spectabilis*), Mongolian Plover (*Charadrius mongolus*), Sulphur-bellied Flycatcher, and Yellow Wagtail (see Records Not Accepted) even though documentation may not conclusively eliminate very similar species that are much less likely to occur in California, such as the Common Eider (*Somateria mollissima*), Greater Sand-Plover (*Charadrius leschenaultii*), Streaked Flycatcher, and Citrine Wagtail (*Motacilla citreola*), respectively. Other members are more reluctant to accept such records, arguing that despite the lack of previous records of these species from California (or North America in some cases), these other species could occur.

GRAY-CHEEKED THRUSH *Catharus minimus* (19, 2). One was at Pt. Reyes, MRN, 29–30 Sep 1997 (CC, GWL; DGS; 1997-175). A first-fall male found dead in Encino, LA, sometime around 25 Oct 1997 (#LACM 110224; 1998-007) was the first for Los Angeles County. Measurements of this bird ruled out the similar Bicknell's Thrush (*C. bicknelli*), and the cool gray-brown upperparts and tail of both birds suggested *minimus* rather than *bicknelli* (Ouellet 1993, McLaren 1995).

GRAY CATBIRD *Dumetella carolinensis* (85, 4). A singing male was at the Carmel R. mouth, MTY, 7–10 Jun 1997 (DR; 1997-112), and individuals were at Desert Center, RIV, 28 Sep 1997 (MAP; 1997-160), Bishop, INY, 17–18 Oct 1997 (TH, DbP, JPa; 1997-206), and San Nicolas I., VEN, 26–27 Oct 1997 (DDJ; WW; 1997-182).

WHITE WAGTAIL *Motacilla alba* (7, 5). Immatures were at SE Farallon I., SF, 10 Oct 1974 (PH†; 1977-169), Goleta, SBA, 9–11 Oct 1978 (LB, JLD, KLG, PEL†, GMcC, DR; 1978-130), Long Beach, LA, 4 Nov 1982–18 Jan 1983 (JBr, JLD, KLG, GMcC, ES†, REW; 1982-119), Moss Landing, MTY, 23 Dec 1988–21 Jan 1989 (DEG; JM, SWM, DEQ, DR†, FKS†; 1988-290), and Bolinas, MRN, 16 Nov 1996 (KH; 1997-032). For years the problem of identifying many basic-plumaged adult and most immature White and Black-backed wagtails was considered intractable. The first three records were previously accepted only as White/Black-backed Wagtails (Binford 1985, Roberson 1986) because they were not considered identifiable to species. The Moss Landing record was in circulation for nearly 10 years, and the Bolinas record was not accepted to species by more than eight members prior to the third round. Sibley and Howell (1998), however, clarified the identification of immatures and basic-plumaged adults of these two species, and this plus commentary by these authors on four of these records led to the acceptance of all five. Photos of the SE Farallon I., Long Beach, and Moss Landing birds show a dusky bar at the base of the secondaries. These photos, as well as detailed sketches of the Goleta and Bolinas birds, also show two well-defined white wing bars formed by dark-based coverts with white tips but limited white edging. During fall migration, when most or all immatures have at least some first basic coverts, this pattern indicates the immature (especially female) White Wagtail (Pyle 1997, Sibley and Howell 1998).

WHITE/BLACK-BACKED WAGTAIL *Motacilla alba/lugens* (2, 1). Descriptions of a bird at the Pajaro R. mouth, SCZ/MTY, 3–11 Dec 1989 (EL; MiF, RK, GL, BMe; 1989-210) indicate one of these two species, but in the opinions of Sibley and Howell (1998) and all Committee members, details were insufficient to allow for a specific identification. Although one observer reported two individuals together, only one bird was described, and no members supported the presence of more than one bird.

BLACK-BACKED WAGTAIL *Motacilla lugens* (9, 1). An immature, probably a male, was at Rodeo Lagoon, MRN, 1 Oct 1989 (DBe†, JDi†, KEM; 1989-130). This record was in circulation for nearly a decade before the article by Sibley and Howell (1998), as well as commentary on the record by these authors, convinced the Committee that the bird could be positively identified as a Black-backed. Immature Black-backed Wagtails can be similar to adult female White Wagtails. The gray (not black) postocular stripe, however, suggested that the bird was an immature, and the extensively dark rump and dark lateral scapulars contrasting with a paler gray back, apparent lack of dark bases to the first basic median coverts, limited amount of gray in the greater coverts mostly confined to the outer coverts, and uniform white wing panel formed by the extensively white greater coverts, tertial edging, and bases of the secondaries confirmed the identification.

SPRAGUE'S PIPIT *Anthus spragueii* (26, 1). A well-documented first-year bird at Furnace Creek Ranch, Death Valley, INY, 10–18 Oct 1997 (MiF, EDG†, JH†, TH, GMcC, MAP, DR†, MJSM, MSM†, LSa†, DGS, BES†; 1997-164) furnished only the second Inyo County record; a photo appeared in *Field Notes* 52:127.

BLUE-WINGED WARBLER *Vermivora pinus* (25, 4). A first-year male was at Butterbredt Spring, KER, 8 Jun 1997 (MTH†; JCW†; 1997-109), a first-year bird was in the San Gabriel Mts. (Big Rock Creek), LA, 21 Jun 1997 (KLG; 1998-191), a probable female was in the San Gabriel Mts. (Switzer Picnic Area), LA, 22 Jun 1997 (ABi; 1997-153), and an adult male was banded at Victorville, SBE, 14 Sep 1997 (SJM†, SJP; 1997-128; photo in *Field Notes* 52:128).

GOLDEN-WINGED WARBLER *Vermivora chrysoptera* (59, 4). A male was at California City, KER, 31 May 1997 (MTH†, JCW†; 1997-111; photo in *Field Notes* 51:929), a female was in Huntington Beach, ORA, 18 Sep 1997 (RFe, JEP, MSM, SS, JWe; 1997-133), a first-fall female was at Big Morongo Canyon Preserve, SBE, 19–25 Oct 1997 (MAP; JCB; 1997-176), and a first-fall male was in Mission Viejo, ORA, 22–23 Nov 1997 (JEP; GMcC; 1998-019).

YELLOW-THROATED WARBLER *Dendroica dominica* (82, 6). An individual at Ferndale, HUM, 29 Dec 1996–Feb 8 1997 (GSL; 1997-092) showed obvious yellow in the supraloral area and was most likely of the nominate race from the southeastern U.S. This race seems to be quite rare in the state, with only a few records from late fall and winter. A male at Pt. Loma, SD, 10 Apr 1997 (PAG; 1997-117), apparent first-year males at Mesquite Springs, INY, 24 May 1997 (JH†, TH, MAP; 1997-097) and in the San Gabriel Mts., LA, 26 May 1997 (JFs; 1997-118), and an individual in Huntington Beach, ORA, 29 May 1997 (NBB, MSM; 1997-135) showed characters of the more regularly occurring race *albilora*, although some *dominica* can show white lores (Jaramillo 1993). A previously unpublished individual in Eureka, HUM, 10 Oct 1997 (GSL; 1997-147) was not identified to race.

GRACE'S WARBLER *Dendroica graciae* (33, 1). One at Montaña de Oro S.P., SLO, 24–26 Oct 1997 (JSR; 1998-036) provided the northernmost accepted coastal record at the time, although a record from Jack's Peak, MTY, during the winter of 1998–1999 has been accepted and will be published in an upcoming report.

PINE WARBLER *Dendroica pinus* (55, 3). An immature female at the Iron Mt. Pumping Plant, SBE, 24 Oct 1995 (EAC†; 1996-056) was documented only by two photographs that, in the initial opinions of some members, may not have eliminated other warblers (such as the Yellow-rumped, *D. coronata*). Because of these concerns, this record was not accepted until the fourth round, illustrating the importance of even brief written descriptions accompanying photographs submitted to the Committee. Apparently overwintering individuals were in Long Beach, LA, 25 Nov 1997–10 Jan 1998 (KGi; JM, RWR, MJSM, MSM, TEW; 1997-193) and Fullerton, ORA, 1 Dec 1997–24 Jan 1998 (JEP; TRC, MTH, GMcC, MAP, DR, MJSM, MSM, DGS; 1997-

194). Both of the latter birds were reported by several observers to be first-year males, although some thought the Fullerton bird might have been a female. Of wood-warblers currently on the review list, the Pine is the one that overwinters in the state most frequently.

CERULEAN WARBLER *Dendroica cerulea* (15, 1). A first-spring male at Birchum Canyon, INY, 23 May 1997 (JH†, TH; JPa, SBT; 1997-106) furnished a first county record, although one was not far to the north at Oasis, MNO, 27 May 1974 (Luther et al. 1979).

WORM-EATING WARBLER *Helmitheros vermivorus* (83, 2). Individuals were at Vandenberg Air Force Base, SBA, 5 Nov 1996 (BH; 1997-024) and in Westminster, ORA, 30 Oct 1997–28 Feb 1998 (JEP; NBB, RFe, MSM, DSt, TEW; 1997-179).

CONNECTICUT WARBLER *Oporornis agilis* (79, 1). A first-year female was banded on SE Farallon I., SF, *24–27* Sep 1996 (PP†; 1997-035). Owing to the paucity of vegetative cover and thorough coverage of this island by birders and banders, SE Farallon I. has hosted 45 of the state's accepted records of this secretive species. In contrast, there are only 10 accepted records for all of Sonoma, Marin, mainland San Francisco, and San Mateo counties, the areas geographically closest to SE Farallon I. Clearly, only a small percentage of those occurring on the mainland are detected.

MOURNING WARBLER *Oporornis philadelphia* (103, 4). An individual was at Galileo Hill, KER, 15–18 Sep 1994 (JLD†, MTH†; JAl†, MOC, GMcC; 1994-154), an adult female was on SE Farallon I., SF, 26 Sep 1996 (PP†; 1997-036), an immature was captured and photographed in hand in Los Angeles, LA, 24–28 Sep 1997 (KLG†; ABi, RL, MSM, JOZ; 1997-157; Figure 9), and another immature (probably female) was photographed on the Oxnard Plain, VEN, 14 Sep 1997 (TEW†; DDJ; 1998-065). The Galileo Hill record met resistance in the first three rounds owing to differences in the descriptions submitted and concern over the whitish throat and fairly broad whitish eye arcs in some of the photos (apparently the result of flash photography; see *Field Notes* 49:102). However, the bird's diagnostic call notes were heard, and photos taken in natural light, showing a yellowish throat and a thin broken yellow-buff eyering, were obtained prior to the fourth round, when the record was accepted.

The mean number of accepted records per year from 1980 to 1997 (4.9) is higher than for any other species on the review list. Also, the number of records from SE Farallon I. (48) suggests that the Mourning Warbler occurs regularly in the state but is poorly detected on the mainland (e.g., only 11 records from Sonoma, Marin, mainland San Francisco, and San Mateo counties) owing primarily to its secretive nature. Nevertheless, this species is retained on the review list in large part because of continuing difficulties many birders have separating it from the MacGillivray's (*O. tolmiei*) and Orange-crowned (*Vermivora celata*) warblers and Common Yellowthroat (*Geothlypis trichas*).

SCARLET TANAGER *Piranga olivacea* (94, 2). A male was in Wilmington, LA, 25–26 Oct 1996 (DMH†; KLG; 1997-027). Kern County's second was a female in Inyokern 31 Oct 1997 (SSt; 1997-195). Three quarters of the state's accepted records are from fall, most in October and November.

PAINTED BUNTING *Passerina ciris* (58, 3). One (probably an immature female) at the Big Sur R. mouth, MTY, 9 Oct 1996 (JBo; 1997-046) was the first for Monterey County. Other females or immatures were at Carpinteria Cr., SBA, 13 Sep 1997 (DCo; RAH; 1997-190) and Huntington Beach, ORA, 13 Sep 1997 (NBB, MSM; 1997-154).

LE CONTE'S SPARROW *Ammodramus leconteii* (28, 1). A singing male at the N end of L. Earl, DN, 21–25 May 1997 (DFx, MMR†; 1997-095) was only California's third in spring; a color photo appeared in *Field Notes* 51:938. This record is remarkably consistent with the dates of the previous two spring records, both

from Furnace Creek Ranch, Death Valley, INY, 21–24 May 1977 (Luther 1980) and 24–25 May 1981 (Binford 1985).

SMITH'S LONGSPUR *Calcarius pictus* (5, 1). One at Furnace Creek Ranch, Death Valley, INY, 4–11 Oct 1997 (NBB, MiF, KLG†, EDG†, JH†, TH, GMcC, MAP, DR†, MJSM, MSM†, LSa†, DGS; 1997-163) was sexed as a female by the buff (not white) edges on the median coverts and aged as an immature by the tapered (rather than squared-off or broadly truncated) outer rectrices. A color photo was published in *Field Notes* 52:144, and four were in Dunn and Beadle (1998).

SNOW BUNTING *Plectrophenax nivalis* (62, 4). On SE Farallon I., SF, a first-fall female occurred 29 Oct 1996 (PP†; 1997-038), a first-fall male 29–30 Oct 1996 (PP; 1997-039). One at the Mattole R. mouth, HUM, 4–10 Nov 1996 (DFx; 1997-047) was the only documented individual of four or five reportedly in Humboldt County in the fall of 1996. A male at Asilomar S.B., MTY, 25–26 Nov 1997 (JHa; DR; 1997-196) was Monterey County's second and one of the southernmost ever found in the state. Only records from Pt. Lobos, MTY, 22 Oct–1 Nov 1985 (Bevier 1990) and the Kelso Valley, KER, 23–27 Dec 1978 (Luther et al. 1983) are from farther south.

COMMON GRACKLE *Quiscalus quiscula* (39, 3). Males at the Iron Mt. Pumping Plant, SBE, 24–25 Oct 1996 (AH; 1997-029) and in Torrance, LA, 3–24 Mar 1997 (DMH†; RL; 1997-086), as well as an individual in Bishop, INY, 14 Dec 1997 (JMF†; 1998-064), were all of the expected Bronzed race *versicolor*. A female was reported accompanying the male in Torrance. Although many members thought this bird was likely identified correctly, it was not described in detail, and most members accepted only the male.

BLACK ROSY-FINCH *Leucosticte atrata* (7, 3). Three individuals were at feeders in Aspendell, INY: a first-year female 11–15 Feb 1995 (GMcC; TH, RAR, ANW†; 1995-033), an apparent male 1 Apr 1995 (NF; 1995-033A), and a female 5 Apr 1997 (SKc, SJP; 1997-099). The females were distinguished from the many Gray-crowned Rosy-Finches (*L. tephrocotis*) by their sooty gray or blackish (rather than brownish) upperparts and more limited gray in the postocular area. Initially, some Committee members considered the possibility that the February and April 1995 sightings were of the same bird, assuming that the appearance of pink in the wings, belly, and rump on the April bird (this color being absent on the bird seen in February) was a result of a seasonal change in plumage. However, this species has no prealternate molt (Pyle 1997), and therefore these differences in plumage were unlikely to be the result of wear, implying there were two birds.

RECORDS NOT ACCEPTED, IDENTIFICATION NOT ESTABLISHED

ARCTIC LOON *Gavia arctica*. One reported by two observers at Mendocino Headlands S.P., MEN, 22 Dec 1994 (1998-129) received no support. One observer was unsure of the identification, which was based entirely on the white flanks. Some members pointed out that the Pacific Loon (*G. pacifica*) may show this mark depending on its position in the water, while others felt that the eye located in the white part of the face and the pale back suggested a Red-throated Loon (*G. stellata*). For more information on Arctic Loon identification see Reinking and Howell (1993).

YELLOW-BILLED LOON *Gavia adamsii*. One at Morro Bay, SLO, 6 Jan 1995 (1995-019) went four circulations before failing in a 6–4 split decision. The bill was described as "pale bluish-green with a yellow cast in the center," which most members felt was incorrect.

SHY ALBATROSS *Thalassarche cauta*. One reported as the race *T. c. salvini* seen from shore off Pt. Piedras Blancas, SLO, 28 May 1996 (1996-093) by an

experienced seabird researcher failed in a split decision on the third circulation. Although the race *T. c. cauta* has been photographed off Oregon (*Field Notes* 51:109, Hunter and Bailey 1997, 1998) and collected off Washington (Slipp 1952), the present record was judged inadequate as a first for California. Some members were concerned that the distance of 2.2 n. miles was too far for necessary details to be seen with the 25 × 150 optics used in this observation. Members felt that the claimed subspecies could not be reasonably inferred from the documentation. Recognition of *salvini* as a species was proposed by Robertson and Nunn (1998). Nevertheless, most members felt the observer probably did see a Shy Albatross *sensu lato*. An individual photographed off Point Arena, MEN, 24 Aug 1999, showing the characters of *T. c. cauta*, is currently under review.

PARKINSON'S PETREL *Procellaria parkinsoni*. One seen 23.5 n. miles SSW of SE Farallon I., SF, 7 Jun 1996 (1996-076) by two experienced seabird researchers eventually failed on the fourth circulation by a vote of 6–4. The Committee thought unanimously that this bird was a member of the genus *Procellaria* and probably a Parkinson's. The identification of members of this genus, however, particularly the distinction between Parkinson's and the Westland Petrel (*P. westlandica*), is notoriously difficult. These two species differ primarily in size, with the Parkinson's being about the size of a Pink-footed Shearwater (*Puffinus creatopus*), whereas the Westland is substantially larger. The White-chinned Petrel (*P. aequinoctialis*) is also larger than Parkinson's and lacks the dark tip to the bill shown by the other two (Marchant and Higgins 1990). Parkinson's has been collected off Mexico (Jehl 1974) and is thus more expected than the Westland or White-chinned, but it would still be a first for California and the United States. Ultimately, the brevity of observation (less than a minute on a moving boat), initial confusion over the identification (the bird was originally thought to be a Westland Petrel), and the inherent difficulty of judging relative size (cf. Grant 1983) weighed heavily against the record.

WEDGE-TAILED SHEARWATER *Puffinus pacificus*. One dark-morph bird seen from shore off Pt. Dume, LA, 21 Dec 1997 (1998-005) by a single observer failed primarily because the sighting was distant and brief and because some parts of the description (e.g., pale area around the bill) were inconsistent with this species. There remain only three accepted records for California, all documented by photographs. Field identification and variation in this species was discussed by Stallcup et al. (1988).

MANX SHEARWATER *Puffinus puffinus*. One on Monterey Bay, MTY, 27 Aug 1977 (1979-029A) was not accepted previously (Dunn 1988). One of the observers successfully sought recirculation at the 1999 annual meeting, arguing that the pattern of records since this species was first fully documented in 1993 made this earlier record more plausible and less significant. At the time it would have been a first record for the North Pacific Ocean. It failed, however, by a 2–8 vote on the first round. Supporters felt that the all-white undertail coverts combined with the relatively short tail were adequate to establish the identification. All members agreed that the bird was likely a Manx Shearwater, but the details written at the time were sparse, and criteria for separating Manx from several similar species had not yet been worked out. Initial confusion over the bird's identity and the brevity of the observation were strong negatives. One seen on Monterey Bay, MTY, 3 Aug 1996 (1997-060) failed on the second round by a split (4–6) decision. During the brief observation from a boat, the observer failed to note the color of the undertail coverts and later recommended against accepting the record. Unfortunately, other observers who saw the white undertail coverts failed to submit details. Distinguishing the Manx Shearwater from similar species was discussed by Howell et al. (1994) and by Roberson (1996).

MASKED BOOBY *Sula dactylatra*. The documentation of an adult 23 n. miles W of Pt. Pinos, MTY, 29 Aug 1997 (1997-197) was frustrating to the Committee. The

observer, highly competent and experienced with seabirds, provided a brief description that failed to address the bill, head, or tail. The underwings were incorrectly described as all white, and the written account was prepared three months after the observation. Nevertheless, the Committee was generally convinced this was either a Red-footed or a Masked Booby, likely the latter.

AGAMI HERON *Agamia agami*. One reported from the Santa Maria River mouth, SLO, 5–12 May 1997 (1997-072) received no support. The included sketch closely resembled a Green Heron (*Butorides virescens*). The apparent large size may have been an illusion (cf. Grant 1983) or possibly the result of a Green Heron hybridizing with another species. A juvenile Tricolored Heron was another suggestion. The details failed to note the extremely long thin bill, chestnut belly, and amber eye color (contra Howell and Webb 1995) of the Agami Heron. The open habitat was wrong for this secretive, sedentary species (Howell and Webb 1995), which has been claimed once before in California but not accepted (Luther 1980).

TRUMPETER SWAN *Cygnus buccinator*. An immature seen with the adult at Grimes, COL, 4 Jan 1996 (1996-037; see accepted record above) failed by a split decision on the third circulation. An adult and an immature at L. Mendocino, MEN, 10 Dec 1994 (1998-128) failed on the first round by a vote of 4–6. The described vocalizations included a single "honk" upon takeoff as well as soft whistles. Members noted that the Tundra Swan (*C. columbianus*) often gives a single honk while Trumpeters almost invariably give a double honk or bugle. Distinguishing the Trumpeter and Tundra swans is notoriously difficult (Patten and Heindel 1994).

MISSISSIPPI KITE *Ictinia mississippiensis*. An adult at Montaña de Oro S.P., SLO, 1 Oct 1996 (1997-009) failed by a split decision on the second circulation. The bird was apparently high aloft and seen briefly; one observer was unsure of the identification, and certain aspects of the descriptions and behavior suggested that the bird may have been a distant immature Peregrine Falcon (*F. peregrinus*). The Mississippi Kite is casual along the coast in fall with only three accepted records, all of immatures, at that season.

HARRIS'S HAWK *Parabuteo unicinctus*. One at Jawbone Canyon, KER, 15 Jun 1993 (1996-080G) was said to have "red-orange" underparts, and the description did not mention the white band at the tip of the tail or the bird's behavior. Some members suggested that an immature Northern Harrier (*Circus cyaneus*) may have been seen.

*ZONE-TAILED HAWK *Buteo albonotatus*. One seen after sunset, without binoculars, for less than 10 seconds from a moving vehicle along a freeway in Los Angeles, LA, 23 Oct 1994 (1994-203) eventually failed on the fourth circulation. One at Lake Casitas, VEN, 21 Dec 1996 (1997-084) was inadequately documented. It was probably the same bird that wintered in the Ventura–Ojai area from 1993–94 to 1995–96 and two years later in 1997–98 (see under Accepted Records). It was reportedly seen by many observers 12 Oct–21 Dec 1996 (*Field Notes* 51:801). Additional documentation is welcome despite the species having been removed from the review list.

CRESTED CARACARA *Caracara plancus*. An immature seen by a single observer near Westmorland, IMP, 14 Dec 1993 (1993-196) failed on the fourth circulation in a 6–4 decision. One of the votes against the record was on the grounds of questionable natural occurrence, whereas the other three members felt the documentation was inadequate to add this species to the state list. It is currently on the Supplemental List on the basis of a bird photographed at Mono L., MNO, in fall 1987 (Roberson 1993). The Imperial Valley record encountered resistance because it would be new to the state and the past pattern of records does not suggest natural occurrence. A caracara reported subsequently (not yet reviewed) from nearby Brawley 31 Jan 1997 showed signs of recent captivity (*Field Notes* 51:802).

EURASIAN KESTREL *Falco tinnunculus*. One female at Humboldt Bay, HUM (1996-005), reportedly boarded a ship bound from Japan. According to Palmer (1988), it was turned over about 1978 to Humboldt State University, where it was held in captivity. It was reportedly examined in 1979 and thought to be of the subspecies *F. t. interstictus* from its dark coloration. The eight duplicate slides received of the bird in captivity show a bird with an all-brown back and short tail, larger than an Aplomado Falcon (*F. femoralis*) in the same cage. Committee members were unsure exactly which species of falcon was involved, although the possibility of a Lanner Falcon (*F. biarmicus*) or a hybrid with a Lanner Falcon was suggested. However, the date stamped on the original slides was May 1973. Thus the submitted photographs were probably not of the same bird reported by Palmer.

YELLOW RAIL *Coturnicops noveboracensis*. One at Ukiah, MEN, 6–7 Apr 1993 (1998-133) received no support. The brief description submitted 5 years after the sighting indicated the bird was "straw color" rather than the dark color normally expected of a Yellow Rail. Also, the location and shape of the white wing patches were not given, and the described behavior (swimming in the open) is not typical of the Yellow Rail.

CARIBBEAN COOT *Fulica caribaea*. One photographed at Palo Alto Baylands, SCL, 13 Dec 1997 (1998-073) received no support. It was one of up to two individuals with enlarged frontal shields present at this site each winter since 1995. This is a known variant of the American Coot (*F. americana*; Roberson and Baptista 1988). The taxonomic validity of the Caribbean Coot is unclear (AOU 1998), but most individuals are indistinguishable from this variant of American Coot, which is not uncommon in California. For these reasons the Committee discourages submissions of the Caribbean Coot.

WILSON'S PLOVER *Charadrius wilsonia*. One seen at Ocean Beach, SD, 30 May 1997 (1997-113) received no support. Failure to mention the size of the bill, along with the fact that the bird fed on bread crumbs, doomed the record. It was suggested the bird may have been a Horned Lark (*Eremophila alpestris*).

COMMON RINGED PLOVER *Charadrius hiaticula*. One heard and studied critically at Point Reyes, MRN, 9 Sep 1996 (1997-071) failed on the second round by a 4–6 vote. The highly qualified observer is experienced with this species and the similar Semipalmated Plover (*C. semipalmatus*). The voice transcription included diagnostic calls, and the physical description pointed toward this species. A slim majority, however, felt more tangible evidence was needed to add this species to the state list. Field separation of the Common Ringed from the Semipalmated Plover is notoriously difficult (Dunn 1993, Lakin and Rylands 1997). None of the other three observers submitted details corroborating the sighting, which would have been a first for the west coast S of Alaska. In general, the Committee takes a conservative stance with respect to single-observer sightings as first state records (cf. Crested Caracara).

AMERICAN OYSTERCATCHER *Haematopus palliatus*. One at Palos Verdes Peninsula, LA, (1997-045) was given a score of 20 by one of the observers using Jehl's (1985) character index, so it was considered a hybrid American × Black oystercatcher by the Committee.

PIED AVOCET *Recurvirostra avosetta*. One reportedly photographed at the Salton Sea, IMP, Feb 1998 (1998-055) would have been a first for North America but received no support from the Committee. The exact location and date were unknown, even to the photographer. The bird in the photograph was a Pied Avocet but almost certainly a captive. It appeared to have clipped wings, and the clear water is unlike any known habitat at the Salton Sea. All submitted records must include the species, date,

locale, and observer. If any element is questionable, the identification is not established. In this case the species was correct, but everything else was doubtful.

LONG-TOED STINT *Calidris subminuta*. Details of a juvenile reported at Abbott's Lagoon, MRN, 6–10 Aug 1996 (1996-112) were suggestive but inconclusive. This bird was reportedly seen by many observers, but descriptions were received from only three, and none of these appeared to be based on contemporaneous notes. There was also confusion with a bright Least Sandpiper (*C. minutilla*) showing a dark forehead, a character of the Long-toed, but also found in a minority of Least Sandpipers. Observers are cautioned that Least Sandpiper shows a great deal of individual variation, and many of its characters overlap with those of the Long-toed Stint (Patten and Daniels 1991). There remain only two acceptable records of this species S of Alaska (Paulson 1993).

CURLEW SANDPIPER *Calidris ferruginea*. One in basic plumage at Abbott's Lagoon, MRN, 14 Oct 1995 (1996-071) failed on the third circulation by a 4–6 vote. Supporters felt that the descriptions, including direct comparison with the Dunlin (*C. alpina*), could apply only to Curlew Sandpiper. Others were concerned that the submitted details were written 6 months after the observation and that the identification was made only when the bird flew, showing the white rump. Most species of *Calidris* show white on the sides of the rump and uppertail coverts, which may give the impression of a white rump when seen briefly or while in flight.

LITTLE GULL *Larus minutus*. An adult in basic plumage at Sunset State Beach, SCZ, 9 Nov 1996 (1996-149) failed narrowly on the fourth circulation by a 7–3 vote. Documentation from additional observers would be welcome.

ICELAND GULL *Larus glaucoides*. Reports were as follows: One at MacKerricher S.P., MEN, 11 Mar 1997 (1997-105); one juvenile at Petaluma, SON, 15 Dec 1996 (1997-107); one specimen from Moss Landing, MTY, 28 Feb 1975 (#UCD WFB-464; 1997-003); one at San Clemente I., LA, 21 Mar 1997 (1997-081); and one at Anaheim, ORA, 8 Mar 1997 (1997-114). The Committee tabled all records of this species at its 1994 meeting (Heindel and Garrett 1995), anticipating a taxonomic change in which the Thayer's Gull (*L. thayeri*) would be lumped with the Iceland Gull. However, the expected taxonomic change did not occur, and the AOU (1998) continues to recognize the Iceland Gull as a separate species. Thus, at its 1998 meeting, the Committee decided to resume review of all submitted Iceland Gull records. These five are the first decisions since then. Other records, including those detailed by Heindel and Garrett (1995), are still under review. None of the five records reported here received much support. In most cases the descriptions were inadequate, but in the case of the Sonoma and Monterey County records, the possibility of a hybrid or intergrade between Kumlien's Iceland Gull (*L. g. kumlieni*) and Thayer's Gull could not be ruled out. The extent to which these taxa hybridize requires further study (AOU 1998), and the range of variation within *L. thayeri* and *L. g. kumlieni* remains uncertain (Zimmer 1991, Howell 1999).

It is thought that "pure" Iceland Gulls in juvenal plumage generally show (1) whitish tertials lacking extensive interior markings, (2) pale outer primaries concolor with or paler than the tertials and inner primaries and showing extensive white fringing, (3) pale secondaries without dark markings and not showing a dark secondary bar, (4) a pale tail without an extensive darker tail band, and (5) pale mantle feathers with limited dark internal markings (cf. Zimmer 1991). However, birds believed to be Iceland Gulls seen in winter on the Atlantic seaboard frequently do not exhibit all of these features. It is not known if this variability is a consequence of individual variation or introgression with *L. thayeri*. Thus, pale west coast birds matching presumed Iceland Gulls on the east coast are not automatically acceptable. The Sonoma and Montery County records above fall into this category. The opposite situation occurs on the east coast

where many sightings of Thayer's Gulls are questioned although they match presumed Thayer's on the west coast.

Juvenile *L. thayeri* may become much whiter toward the end of the winter because of bleaching and feather wear. That phenomenon may account for the appearance of some of the purported Iceland Gulls seen in California late in the winter. In any event, none of the five records reported here meets all the tentative criteria for a "pure" Iceland Gull as outlined above.

SLATY-BACKED GULL *Larus schistisagus*. One molting from second basic to second alternate plumage photographed at the Ventura Marina, VEN, 5 Feb 1995 (1995-053) received only three votes of endorsement. Identification of immatures of this species is still being worked out, and the problem is clouded in western North America by extensive hybridization between the Glaucous-winged Gull (*L. glaucescens*) and other species. Immatures of such hybrids may show an enormous amount of variation, the extent of which is unknown. Most Committee members and all outside experts from Alaska, Asia, and Europe agreed that there was nothing wrong with the bird for Slaty-backed Gull and that it may have been that species. But the lack of detailed information on the wing and tail pattern combined with lack of knowledge about variation in various hybrids precluded adding this species to the state list on the basis of this record. A photograph was published in *Field Notes* 49:199. Three additional records of this species are currently under consideration. For more information on identification and hybridization, see Goetz et al. (1986), Gustafson and Peterjohn (1994), Pyle (1997), and King and Carey (1999).

SOOTY TERN *Sterna fuscata*. An adult reported at Pt. Firmin, San Pedro, LA, 18 Aug 1996 (1997-016), thought possibly to be one of up to three birds at Bolsa Chica, ORA (see Accepted Records), failed on the second circulation. The distant views precluded a description of the head pattern, and the Bridled Tern (*S. anaethetus*) could not be eliminated. It would have been a first county record.

BROAD-BILLED HUMMINGBIRD *Cynanthus latirostris*. One reported in Huntington Beach, ORA, 1 Nov 1994 (1995-006) received eight accept votes on all four rounds, but the brevity of the description and the possibility of an aberrant pink-billed Anna's Hummingbird (rare but known to occur occasionally) prevented acceptance. Another hummingbird in Westchester, LA, 24 Sep 1996 (1997-018) was almost certainly of this species, as an experienced observer heard the bird give this species' distinctive call repeatedly. However, the bird was seen only briefly, without binoculars, and in poor light, and the coloration of the plumage and soft parts could not be evaluated to confirm the identification.

THREE-TOED WOODPECKER *Picoides tridactylus*. The description of a bird near Ukiah, MEN, 11 Apr 1993 (1998-131) included features suggesting this species, including a yellow cap and barring on the back. Hairy Woodpeckers (*P. villosus*), however, particularly juveniles, may have yellow or orange feathering instead of the typical red in the crown (Trochet et al. 1988, Kaufman 1993), and this bird was not described in detail sufficient to establish such an unusual occurrence. California's only accepted record of the Three-toed Woodpecker, from the Warner Mts., MOD, 2 Nov 1985 (Trochet et al. 1988, Bevier 1990), is currently being reevaluted.

GREATER PEWEE *Contopus pertinax*. A report of a bird at Brawley, IMP, 3 May 1997 (1997-115) consisted only of a brief, second-hand description. Most Committee members oppose accepting second-hand reports, and this one lacked sufficient detail to indicate that a Greater Pewee was seen. Another was reported at San Elijo Lagoon, SD, 1 May 1997 (1997-116). Both of these records would have been unprecedented in spring. Although overwintering Greater Pewees have remained as late as 14 Apr, none has stayed later, and there are no accepted records of birds thought to represent spring "overshoots" (although one at SE Farallon I. on 1 Jun

1998 is currently under review). Many members thought the descriptions of both birds could have pertained to Olive-sided Flycatchers (*C. cooperi*), which can appear to lack white tufts on the sides of the rump and show a pale mandible, a somewhat crested head shape, and an olive-gray breast that appears to lack a white median stripe, characters usually associated more with the Greater Pewee.

EASTERN WOOD-PEWEE *Contopus virens*. The record of one at Los Osos, SLO, 21 Oct 1986 (1987-026A), previously not accepted (Pyle and McCaskie 1992), was reevaluated. Most members agreed that the bird was probably an Eastern Wood-Pewee, as repeated clear upslurred "*pee-wee*" calls and chip notes seemingly consistent with this species were described. However, most members thought that the information on the vocalizations (e.g., quality, cadence, pitch, and accenting) was insufficient to establish that these calls were outside the range of variation of the Western Wood-Pewee (*C. sordidulus*). Furthermore, descriptions of the bill suggested that the mandible was dark, a character shown by few Eastern Wood-Pewees but most Westerns.

ALDER FLYCATCHER *Empidonax alnorum*. The description of the plumage and "*peep*" calls of an *Empidonax* at Cosumnes R. Preserve, SAC, 15 Sep 1997 (1998-047) were apparently consistent with an Alder Flycatcher, but a majority of Committee members felt that the Willow Flycatcher (*E. traillii*) could not be eliminated. Plumage distinctions allowing the separation of most Willow and Alder Flycatchers in the hand have been identified (P. Unitt) but are not yet published. While the emphatic "*peep*" or "*bik*" calls of the Alder (versus the softer, more liquid "*whit*" of the Willow) may be diagnostic for this species (LeGrand 1979, Lehman 1985, Kaufman 1990), variation among Willow Flycatcher call notes may overlap somewhat with the calls of the Alder (Heindel 1997). Problems in transcription of these calls further frustrate evaluation of claims of calling Alder Flycatchers.

GREAT CRESTED FLYCATCHER *Myiarchus crinitus*. The description of a bird in the Sepulveda Basin, LA, 15 Oct 1997 (1998-033) mentioned a bright yellow belly contrasting sharply with a dark gray breast, as well as a pinkish base to the mandible, features indicating this species. The back and head, however, were described as brown, with no mention of olive tones; this coloration is more typical of the Brown-crested Flycatcher (*M. tyrannulus*). In addition, other key features, such as tertial and rectrix pattern, were not described in detail, and a majority of Committee members were unwilling to support the record without additional detail.

THICK-BILLED KINGBIRD *Tyrannus crassirostris*. Members not accepting a record from the Puente Hills, LA, 22 Apr 1995 (1995-43) noted the late spring date, the lack of any mention of the dark-headed, masked appearance typical of this species, and the entirely white (rather than pale yellowish) underparts. Supporters felt that the date was consistent with a lingering wintering bird and that a Thick-billed Kingbird in spring might be sufficiently worn that the yellow on the underparts would be difficult to detect. After four rounds, however, three members were still unwilling to accept.

BLUE-HEADED VIREO *Vireo solitarius*. Individuals were reported at Lassen Volcanic N.P., TEH, 9 Sep 1997 (1997-140) and San Pedro, LA, 26–29 Sep 1997 (1997-142 and 1998-123). Descriptions of both birds contained several features suggesting the Blue-headed Vireo, but most members felt that neither bird was described in sufficient detail to allow distinction from Cassin's Vireo (*V. cassinii*). Distinguishing some Cassin's and Blue-headed Vireos can be difficult, particularly in fall, when fresh, bright Cassin's (especially males) can appear similar to Blue-headed Vireos; see Heindel (1996) for identification criteria. The CBRC decided to review Blue-headed Vireo records from 1997 and later, and several accepted records will be discussed in the next report. At least some pre-1997 records will undergo some sort of review, and anyone who has observed this species in the state in any year is urged

to submit documentation to the Committee.

YELLOW-GREEN VIREO *Vireo flavoviridis*. Individuals reported at Goleta, SBA, 28 Aug 1997 (1998-035) and Pt. Loma, SD, 28 Sep 1997 (1997-145) may have been Yellow-green Vireos, but most members thought that the Red-eyed Vireo (*V. olivaceus*) was not eliminated in either case. The Goleta bird preceded the earliest accepted record for the state by 11 days.

NORTHERN WHEATEAR *Oenanthe oenanthe*. The description of one reported on the Carrizo Plain, SLO, 20 Sep 1997 (1997-136) was consistent with this species, and a number of members thought that the identification was likely correct. The documentation was not sufficiently detailed, however, to establish such an unusual inland record.

YELLOW WAGTAIL *Motacilla flava*. A calling individual seen only in flight at Tomales Bay, MRN, 4 Sep 1995 (1995-129) was thought by all members to have been either a Yellow or Citrine wagtail. The observer identified the bird as a Yellow from his experience with the calls of both of these species. However, some of the calls given by eastern Yellow Wagtails (the races most likely to account for California's records) are similar to those of the Citrine (Harris et al. 1989), and most Citrines recorded in Hong Kong give a flight call that is virtually inseparable from that of the Yellow (Leader 1996). Therefore, for individuals occurring in California, confident distinction of these species requires the assessment of plumage features (summarized by Leader 1996) that were not visible on the flying bird. Because few members thought that the details actually eliminated the Citrine, voting was split primarily along philosophical lines concerning the probability of occurrence of the two possible species. Those voting to accept as a Yellow Wagtail noted that the Citrine is unknown in western North America and that the location and time of year are consistent with previously accepted records of the Yellow Wagtail (all are coastal, between 27 Aug and 21 Sep). The four members who did not accept the record in the fourth round cited the precedent of a Citrine Wagtail in Mississippi in 1992 (*Am. Birds* 46:278, DeBenedictis 1995) and opined that the Citrine is a good candidate for vagrancy to the west coast by way of Siberia and Alaska. In the past the Committee accepted several essentially fly-over records of Yellow Wagtails if the call was accurately described by observers experienced with the species. The Citrine Wagtail, however, may not have been eliminated in all these cases, and the Committee may reevaluate previous claims of this species to ensure consistency.

GRAY SILKY-FLYCATCHER *Ptilogonys cinereus*. One was reported at Pt. Loma, SD, 4 Jun 1983 (1993-146). Although many members felt that the identification was probably correct, the observer was not sure whether the bird had yellow undertail coverts, and there was no description of a crest. These factors left such a rare species insufficiently documented in the opinions of most members, and some thought that another species, such as Townsend's Solitaire (*Myadestes townsendi*), might have been involved.

BLUE-WINGED WARBLER *Vermivora pinus*. A report of two on San Clemente I., LA, 15 Apr 1997 (1997-079) would have been unprecedented, both for the early date (24 days earlier than any accepted spring record) and for the presence of two birds together. All members felt that more thorough details were necessary for acceptance of such an exeptional record. The description of an individual reported at the Cosumnes R. Preserve, SAC, 15 Sep 1996 (1997-075) fit this species well, but the observation (2–3 seconds) was too brief in the opinions of a majority of members to establish an unprecedented Central Valley record. The only accepted inland record for northern California is of one at Bridgeport L., MNO, 18 Jun 1984 (Dunn 1988).

GRACE'S WARBLER *Dendroica graciae*. One reported at Chilao in the San Gabriel Mts., LA, 7 Sep 1997 (1997-022) was seen only "for a second" and was

therefore understandably not described in detail. An individual had overwintered at this location the previous winter (Garrett and Singer 1998), but no members thought that the documentation was adequate to establish a second winter of occurrence. Another reported at Pt. Loma, SD, 27 Sep 1997 (1997-144) received little support.

PINE WARBLER *Dendroica pinus*. A report of two in the Sepulveda Basin, LA, 24 Sep 1996 (1997-023) would have represented the second earliest fall date, and the first record of two together, in the state. The Committee unanimously questioned the identification, as other species (e.g., Blackpoll Warbler, *D. striata*) were not eliminated. One reported at Little Lake, INY, 26 Apr 1997 (1997-119) was fairly well described. However, because this species is rare in the state both inland (only six records) and in spring (only single records on 7 Apr, 31 May, and 5–6 Jun), a majority of members desired more thorough documentation than was provided. The Committee recognizes that a number of records falling outside known patterns of spatiotemporal distribution of California birds are valid. However, most members tend to be conservative in voting on records that fall outside well-established patterns, helping to ensure (to the extent possible) that the predominant patterns of distribution are supported by valid records.

WORM-EATING WARBLER *Helmitheros vermivorus*. Only the head and breast of one reported in Wilmington, LA, 29 Sep 1996 (1996-174) were seen as the bird sat motionless in a tree, and the description was therefore understandably brief. Most members thought that the bird was probably identified correctly but were not willing to endorse such a sparingly documented record.

CONNECTICUT WARBLER *Oporornis agilis*. A report of one at Furnace Creek Ranch, Death Valley, INY, 12 Sep 1997 (1997-188) did not eliminate other species. Likewise, a majority of members determined that one reported at Montaña de Oro S.P., SLO, 16 Sep 1996 (1996-175) was not adequately documented. Another reported at Chorro Cr. near Morro Bay, SLO, 20 Sep 1997 (1998-037) received little support.

MOURNING WARBLER *Oporornis philadelphia*. The description of one reported at Galileo Hill, KER, 14 Sep 1997 (1997-132) consisted of a compilation of field marks seen by several observers, making it difficult for Committee members to determine which characters were actually seen by the reporting observer and which were reported second-hand. Generally, the CBRC lends little weight to characters reported second-hand and not seen by the reporting observers themselves. Several members also thought that the description better fit an Orange-crowned Warbler of the race *celata* or *orestera*.

SCARLET TANAGER *Piranga olivacea*. One reported in Banning Park, Wilmington, LA, 18–19 Oct 1997 (1997-169) was rumored to have been seen by a number of observers and even photographed. Only one observer, however, submitted documentation, and a majority of members thought that these details did not eliminate other species. If other observers submit documentation of this record (and preferably photos), the Committee will reevaluate it.

EASTERN TOWHEE *Pipilo erythrophthalmus*. Committee members unanimously considered a female reported in Oakland, ALA, 30 Sep 1984 (1998-146) to be a Spotted Towhee (*P. maculatus*), possibly of the race *oregonus*. This race occurs in California in winter (Grinnell and Miller 1944) and shows a blackish-brown hood and reduced white spotting on the scapulars and upper secondary coverts (Pyle 1997).

PAINTED BUNTING *Passerina ciris*. One in Huntington Beach, ORA, 3 Sep 1993 (1995-013) was seen by a number of birders, but only two submitted descriptions. All Committee members felt that a female/immature Painted Bunting was present, but after four rounds, two members were still not convinced that the record

had been adequately documented.

BLACK ROSY-FINCH *Leucosticte atrata*. The details accompanying a report of one near Independence, INY, 6 Jul 1997 (1997-124) were not adequate to rule out the Gray-crowned Rosy-Finch or to establish an unprecedented midsummer record.

WHITE-WINGED CROSSBILL *Loxia leucoptera*. A report of 40–50 female-plumaged birds S of Albion, MEN, 25 Dec 1992 (1998-130) failed to gain any support. The presence of white wingbars was the only plumage feature noted, and size and structure were not described at all. As a result, species such as the Pine Siskin (*Carduelis pinus*) and American Goldfinch (*C. tristis*) were not eliminated.

RECORDS NOT ACCEPTED, NATURAL OCCURRENCE QUESTIONABLE (IDENTIFICATION ACCEPTED)

BARNACLE GOOSE *Branta leucopsis*. One collected at Orestimba Creek near Newman, STA, 8 Nov 1997 (1998-149) was correctly identified but unanimously judged to have been an escaped captive. Photographs of the mounted specimen were provided by Roger Wilbur. The specimen is currently in the private collection of Kenny Boyd in Fresno (*fide* BED). Barnacle Geese are common in captivity, and records of presumed escapes come from across North America. The species breeds in Greenland, and apparently natural vagrants have occurred along the Atlantic coast of Canada and the northeastern United States. For further discussion see Ryff (1984) and Bevier (1990).

GREAT TIT *Parus major*. An individual well photographed at a feeder in Chester, PLU, 12–13 Apr 1997 (CAB†; 1998-068) was thought by all members to be an escapee. This species is known to be held in captivity in at least some parts of the state, and presumed escapees have been reported on several occasions in southern California. Although this species is not generally thought of as a long-distance migrant, it is conceivable that a Great Tit from the northeasternmost part of the species' range in E Asia could make it to North America by wandering to the western Aleutians; there is a record from Little Diomede Island, Alaska, 2 Sep 1988 (AOU 1998). Nevertheless, it is highly unlikely that any such vagrant would then make the trip south all the way to California. Therefore, there is likely no plausible mechanism for the natural occurrence of this species in the state.

PAINTED BUNTING *Passerina ciris*. Adult males were at Chula Vista, SD, 20–21 Mar 1997 (1997-064) and Pescadero, SM, 22 Nov–27 Dec 1997 (1997-210). The bird at Chula Vista was in "perfect" plumage, showing no abnormal wear or orangish (rather than reddish) tones that might suggest prior captivity. However, this location is close to the Mexican border, where fairly large numbers are sold as cage birds, and most members thought the probability of prior captivity was too high for acceptance of this record. The Pescadero bird was described as having a slightly orangish belly, and it was seen too briefly for plumage wear, bands, or other possible signs of captivity to be assessed. The Committee continues to be cautious with records of adult males, in part because they are held in captivity more often than females and immatures. Furthermore, the lack of any records of females and immatures in winter suggests to some members that adult males seen during this period are more likely to be escapees than vagrants (R. A. Hamilton unpubl. data).

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LITERATURE CITED

American Birding Association. 1996. ABA Checklist: Birds of the Continental United States and Canada, 5th ed. Am. Birding. Assoc., Colorado Springs.

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D. C.

Arntz, W. E. 1986. The two faces of El Niño 1982–83. Meeresforsch. 31:1–46.

Bailey, S. F., Pyle, P., and Spear, L. 1989. Dark *Pterodroma* petrels in the North Pacific: Identification, status and North American occurrence. Am. Birds 43:400–415.

Beck, R. H. 1910. Waterbirds in the vicinity of Point Pinos, California. Proc. Calif. Acad. Sci., ser. 4, 3:57–72.

Bevier, L. R. 1990. Eleventh report of the California Bird Records Committee. W. Birds 21:145–176.

Binford, L. C. 1985. Seventh report of the California Bird Records Committee. W. Birds 16:29–48.

Clapp, R. B., Klimkiewicz, M. K., and Kennard, J. H. 1982. Longevity records of North American birds: Gaviidae through Alcidae. J. Field Ornithol. 53:81–124.

Clement, P. 1987. Field identification of west Palearctic wheatears. Br. Birds 80:137–157, 187–238.

Collins, C. T. 1997. Hybridization of a Sandwich and Elegant Tern in California. W. Birds 28:169–173.

Daniels, B. E., Hays, L., Hays, D. Morlan, J., and Roberson, D. 1989. First record of the Common Black-Hawk for California. W. Birds 20:11–18.

DeBenedictis, P. A. 1995. 1994 ABA checklist report. Birding 27:367–368.

DeBenedictis, P. A. 1996. 1995 ABA checklist report. Birding 28:399–405.

Dunn, J. L. 1988. Tenth report of the California Bird Records Committee. W. Birds 19:129–163.

Dunn, J. L. 1993. The identification of Semipalmated and Common Ringed plovers in alternate plumage. Birding 25:238–243.

Dunn, J. L., and Beadle, D. 1998. Longspurs: Distribution and identification in basic plumage. Birders' J. 7:68–93.

Erickson, R. A., Hamilton, R. A., Howell, S. N. G., Pyle, P., and Patten, M. A. 1995. First record of the Marbled Murrelet and third record of the Ancient Murrelet for Mexico. W. Birds 26:39–45.

Erickson, R. A., and Terrill, S. B. 1996. Nineteenth report of the California Bird Records Committee: 1993 records. W. Birds 27:93–126.

Eskelin, T., and Pursiainen, J. 1998. The status of "Lesser Black-backed Gulls" of *heuglini*, *graellsii* and *intermedius* type in Finland. Alula 2:42–54.

Friesen, V. L., Piatt, J. F., and Baker, A. J. 1996. Evidence from cytochrome *b* sequences and allozymes for a "new" species of alcid: The Long-billed Murrelet (*Brachyramphus perdix*). Condor 98:681–690.

Garrett, K. L., and Singer, D. S. 1998. Report of the California Bird Records Committee: 1995 records. W. Birds 29:133–156.

Goetz, R. E., Rudden, W. M., and Snetsinger, P. B. 1986. Slaty-backed Gull winters on the Mississippi River. Am. Birds 40:207–216

Grant, P. J. 1983. Size illusion in birds. Br. Birds 76:327–334.

Grinnell, J., and Miller, A.H. 1944. The distribution of the birds of California. Pac. Coast Avifauna 27.

Gustafson, M. E., and Peterjohn, B. G. 1994. Adult Slaty-backed Gulls. Variability in mantle color and comments on identification. Birding 26:243–249.

Harris, A., Tucker, L., and Vinicombe, K. 1989. The Macmillan Field Guide to Bird Identification. Grange Books, London.

Harris, S. W. 1996. Northwestern California Birds. Humboldt State Univ., Arcata, CA.

Heindel, M. T. 1996. Field identification of the Solitary Vireo complex. Birding 28:458–471.

Heindel, M. T. 1997. Willow Flycatcher call-note variation. Birding 29:505–507.

Heindel, M. T., and Garrett, K. L. 1995. Sixteenth annual report of the California Bird Records Committee. W. Birds 26:1–33.

Heindel, M. T., and Patten, M. A. 1996. Eighteenth report of the California Bird Records Committee: 1992 records. W. Birds 27:1–29.

Heindel, M., and Pyle, P. 1999. Identification of Yellow-bellied and "Western" flycatchers. Birders' J. 8:78–87.

Howell, S. N. G. 1999. Shades of gray: The Catch 22 of Thayer's Gull. Birders' J. 7:305–309.

Howell, S. N. G., and Pyle, P. 1997. Twentieth report of the California Bird Records Committee: 1994 records. W. Birds 28:117–141.

Howell, S. N. G., Spear, L. B., and Pyle, P. 1994. Identification of Manx-type shearwaters in the eastern Pacific. W. Birds 25:169–177.

Howell, S. N. G., and Webb, S. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, England.

Hunter, M. G., and Bailey, D. C. 1997. Oregon's first White-cappped Shy Albatross. Ore. Birds 23:35–39.

Hunter, M. G., and Bailey, D. C. 1998. Shy conclusions. Some lessons in pelagic birding. Birding 30: 234–239.

Jaramillo, A. 1993. Subspecific identification of Yellow-throated Warblers. Birders' J. 2:160.

Jehl, J. R., Jr. 1973. The distribution of marine birds in Chilean waters in winter. Auk 90:114–135.

Jehl, J. R., Jr. 1974. The near-shore avifauna of the Middle American west coast. Auk 91: 681–699.

Jehl, D. A., and Jehl, J. R., Jr. 1981. A North American record of the Asiatic Marbled Murrelet (*Brachyramphus marmoratus perdix*). Am. Birds 35:911–912.

Jehl, J. R., Jr. 1985. Hybridization and evolution of oystercatchers on the Pacific coast of Baja California. Ornithol. Monogr. 36:484–504.

Jonsson , L. 1992. Birds of Europe with North Africa and the Middle East. Princeton Univ. Press, Princeton, N.J.

Kaufman, K. 1990. A Field Guide to Advanced Birding. Houghton Mifflin, Boston.

Kaufman, K. 1993. Identifying the Hairy Woodpecker. Am. Birds 47:311–314.

King, J. R., and Carey, G. J. 1999. Slaty-backed Gull hybridization and variation in adult upperpart colour. Birders' J. 8:88–93.

Klimkiewicz, M. K., and Futcher, A. G. 1989. Longevity records of North American birds: Supplement 1. J. Field Ornithol. 60:469–494.

Lakin; I., and Rylands, K. 1997. The Semipalmated Plover in Devon: The second British record. Birding World 10:212–216.

Leader, P. 1995. Field identification of Dusky, Radde's and Yellow-streaked Warblers. Hong Kong Bird Rep. 1994, pp. 170–180.

Leader, P. 1996. Field identification of Citrine Wagtail and races of Yellow Wagtail in Hong King. Hong Kong Bird Rep. 1995, pp. 210–217.

LeGrand, H. E., Jr. 1979. Comments on the call notes of Alder and Willow flycatchers. Chat 43:66.

Lehman, P. E. 1985. Calls of Willow and Alder flycatchers. W. Birds 16:189.

Lehman, P. E. 1994. The Birds of Santa Barbara County, California. Vert. Mus., Univ. Calif., Santa Barbara.

Lethaby, N., and Bangma, J. 1999. Band-tailed Gulls in North America—Some notes on identification. Birding 31:57–63.

Lewington, I., Alstrom, P., and Colston, P. 1991. A Field Guide to the Rare Birds of Britain and Europe. Domnio, Jersey, U.K.

Luther, J. S. 1980. Fourth report of the California Bird Records Committee. W. Birds 11:161–173.

Luther, J., McCaskie, G., and Dunn, J. 1979. Third report of the California Bird Records Committee. W. Birds 10:169–187.

Luther, J., McCaskie, G., and Dunn, J. 1983. Fifth report of the California Bird Records Committee. W. Birds 14:1–16.

Madge, S. 1996. Races apart. Birdwatch. 49:28–33

Marchant, S., and Higgins, P. J. 1990. Handbook of Australian, New Zealand and Antarctic Birds, vol. 1. Oxford Univ. Press, Melbourne.

McCaskie, G., and San Miguel, M. 1999. Report of the California Bird Records Committee: 1996 records. W. Birds 30:57–85.

McLaren, I. A. 1995. Field identification and taxonomy of Bicknell's Thrush. Birding 27:358–366.

Mlodinow, S. G. 1997. The Long-billed Murrelet (*Brachyramphus perdix*) in North America. Birding 29:460–475.

Morlan, J. 1985. Eighth report of the California Bird Records Committee. W. Birds 16:105–122.

Ouellet, H. 1993. Bicknell's Thrush: Taxonomic status and distribution. Wilson Bull. 105:545–571.

Palmer, R. S. (ed.) 1988. Handbook of North American Birds, vol. 5. Yale Univ. Press, New Haven, CT.

Patten, M. A. 1997. Systematics of the Marbled Murrelets. Birding 29:473–474.

Patten, M. A. 1998. Changing seasons, fall migration, August 1–November 30, 1997: Nora, El Niño, and vagrants from far afield. Field Notes 52:14–18.

Patten, M. A., and Daniels, B. E. 1991. First record of the Long-toed Stint in California. W. Birds 22:131–138.

Patten, M. A., and Erickson, R. A. 1994. Fifteenth report of the California Bird Records Committee. W. Birds 25:1–34.

Patten, M. A., Finnegan, S. E., and Lehman, P. E. 1995. Seventeenth report of the California Bird Records Committee. W. Birds 26:113–143.

Patten, M. A., and Heindel, M. T. 1994. Identifying Trumpeter and Tundra swans. Birding 26:306–318.

Paulson, D. 1993. Shorebirds of the Pacific Northwest. Univ. Wash. Press, Seattle.

Phillips, A. R. 1994. A tentative key to the species of kingbirds, with distributional notes. J. Field Ornithol. 65:295–306.

Pitman, R. L., and Jehl, J. R., Jr. 1998. Geographic variation and reassessment of species limits in the "Masked" Boobies of the eastern Pacific Ocean. Wilson Bull. 110:153–170.

Pyle, P. 1997. Identification Guide to North American Birds, part I. Slate Creek Press, Bolinas, CA.

Pyle, P., and McCaskie, G. 1992. Thirteenth report of the California Bird Records Committee. W. Birds 23:97–132.

Pyle, P. 1997. First-year Slaty-backed Gull. Birders' J. 6:251.

Reed, J. R. 1988. Inca Terns in the Bay of Panama during the 1982—1983 El Niño event. Am. Birds 42:172–173.

Reinking, D. L., and Howell, S. N. G. 1993. An Arctic Loon in California. W. Birds 24:189–196.

Ridgely, R., and Gwynne, J. A., Jr. 1989. A Guide to the Birds of Panama, with Costa Rica, Nicaragua, and Honduras, 2nd ed. Princeton Univ. Press, Princeton, N.J.

Roberson, D. 1985. Monterey Birds. Monterey Peninsula Audubon Soc., Pacific Grove, CA.

Roberson, D. 1986. Ninth report of the California Bird Records Committee. W. Birds 17:49–77.

Roberson, D. 1993. Fourteenth report of the California Bird Records Committee. W. Birds 24:113–166.

Roberson, D. 1996. Identifying Manx Shearwaters in the northwest Pacific. Birding. 28:18–23.

Roberson, D. 1998. Sulids unmasked: Which large booby reaches California? Field Notes 52:276–287.

Roberson, D., and Baptista, L. F. 1988. White-shielded coots in North America: A critical evaluation. Am. Birds 45:399–403, 1067–1081.

Robertson, C. J. R., and Nunn, G. B. 1998. Towards a new taxonomy for albatrosses, in Albatross Biology and Conservation (G. Robertson and R. Gales, eds.), pp. 13–19. Surrey Beatty, Sydney.

Robertson, W. B., Jr., and Woolfenden, G. E. 1992. Florida bird species: An annotated list. Florida Ornithol. Soc. Spec. Publ. 6.

Rosenberg, K. V., Ohmart, R. D., Hunter, W. C., and Anderson, B. W. 1991. Birds of the Lower Colorado River Valley. Univ. Ariz. Press, Tucson.

Ryff, A. J. 1984. The long sea-flights: A precise tradition. Birding 16:146–154.

Sallaberry, M., Aguire, J., and Yañez, J. 1992. Adiciones a la lista de aves de Chile: Descripción de especies nuevas para el pais y otros datos ornitológicos. Noticiario Mensual, Mus. Nac. Hist. Nac. 321:3–10.

Sauer, J. R., Hines, J. E., Gough, G., Thomas, I., and Peterjohn, B. G. 1997. The North American Breeding Bird Survey results and analysis, version 96.4. Patuxent Wildlife Research Center, Laurel, MD.

Sealy, S. G., Carter, H. R., and Alison, D. 1982. Occurrences of the Asiatic Marbled Murrelet [*Brachyrmphus marmoratus perdix* (Pallas)] in North America. Auk 99:778–781.

Sealy, S. G., Carter, H. R., Shuford, W. D., Powers, K. D., and Chase, C. A. III. 1991. Long-distance vagrancy of the Asiatic Marbled Murrelet in North America 1979–1989. W. Birds 22:145–155.

Short, L. L., Jr., and Crossin, R. S. 1967. Notes on the avifauna of northwestern Baja California. Trans. San Diego Soc. Nat. Hist. 14:283–299.

Sibley, D. 1993. An Asiatic Marbled Murrelet in Ontario. Birders' J. 2:276–277.

Sibley, D. A., and Howell, S. N. G. 1998. Identification of White and Black-backed wagtails in basic plumage. W. Birds 29:180–198.

Slipp, J. W. 1952. A record of the Tasmanian White-capped Albatross, *Diomedea cauta*, in American North Pacific waters. Auk 69:458–459.

Stallcup, R., Morlan, J., and Roberson, D. 1988. First record of the Wedge-tailed Shearwater in California. W. Birds 19:61–68.

Stevenson, H. M., Goodnight, L. E., and Kingsbery, C. L. 1980. An early record of the Band-tailed Gull in Florida. Fla. Field Nat. 8:21–23.

Terrill, S. B., and Terrill, L. S. 1981. On the field identification of Yellow-green, Red-eyed, Philadelphia, and Warbling vireos. Continental Birdlife 2:144–149.

Trochet, J., Morlan, J., and Roberson, D. 1988. First record of the Three-toed Woodpecker in California. W. Birds 19:109–115.

Veit, R. R. 1985. The changing seasons: Rarities may, and often do, indicate extensions of breeding range. Am. Birds 39:879–884.

Winter, J., and McCaskie, G. 1975. 1973 report of the California Field Ornithologists Records Committee. W. Birds 6:135–144.

Woods, R. W. 1988. Guide to Birds of the Falkland Islands. Anthony Nelson, Shropshire, England.

Zimmer, K. J. 1991. Plumage variation in "Kumlien's" Iceland Gull. Birding 23:254–269.

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MOLT CYCLES AND SEQUENCES IN THE WESTERN GULL

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ABSTRACT: We describe the molt cycle of the Western Gull (*Larus occidentalis*) in central California on the basis of field observations of unmarked birds. The Western Gull has one partial and one complete molt per year. The first and second partial molts span up to 7 or 8 months, subsequent prealternate molts about 4 to 6 months. The complete prebasic molt spans 5–6 months. We propose that the Western Gull exemplifies a pattern more widespread among large water birds: the first partial ("postjuvenal") molt appears homologous with later prealternate molts, not with the prebasic molt, as considered previously.

The Western Gull (*Larus occidentalis*) is a locally common breeding species along the west coast of North America. Two subspecies are widely recognized (AOU 1957): nominate *occidentalis*, which breeds from Washington and perhaps southern British Columbia (Campbell et al. 1990) to central California, and the more southerly *wymani*, which breeds from central California south to central Baja California.

Despite the Western Gull's being large and conspicuous, its molt cycles and sequences are treated inadequately in the literature. Pierotti and Annett (1995) recently described the plumage sequences of the Western Gull. They based their account largely upon the seminal work of Dwight (1925), whom they considered the only author in North America to have tackled this complex subject, but they overlooked the important work of McCaskie (1983). For example, Pierotti and Annett (1995) limited the complete second prebasic molt of Western Gulls to August and September, while McCaskie gave July to October for this molt. Conversely, Pierotti and Good (1994) noted that the complete second prebasic molt of the Herring Gull (*L. argentatus*) takes a minimum of four months and usually as long as six, making it all the more surprising that the equally large Western Gull might require only two.

STUDY AREA AND METHODS

From January 1997 through May 1999 we made regular observations, in all months of the year, of Western Gulls at Bolinas Lagoon, Marin County, and Bodega Bay, Sonoma County. We used calendar years (CY) to avoid potential ambiguity in describing the age of a bird; thus, the bird's life during its first calendar year (CY1) is from about June through December (see Figure 1). Each month we made close-range observations of up to 50 CY1, 50 CY2, 30 CY3, 20 CY4, and 50 definitive-plumaged ("adult") individuals and kept track of molt and change in appearance of all age classes. From January to July 1997 we simply observed birds in an attempt to understand molt and changing appearance, then from August 1997 to May 1999 we noted molt critically on 326 CY1, 429 CY2, 331 CY3, 146 CY4, and 350

	J	F	M	A	M	J	J	A	S	O	N	D
CY1: PA1					E	H			F	AAAAAAAAA..		
CY2: PA1	..AAAAAAA.. ? ?											
PB2					BBBBBBBBBBBBBBBBB							
PA2										AAAAAAAAA..		
CY3: PA2	..AAAAAAA.. ? ?											
PB3					BBBBBBBBBBBBBBBBB							
PA3										AAAAAAAAA..		
CY4: PA3	..AAAA.. ? ?											
PB4					BBBBBBBBBBBBBBBBB							
PA4										AAAAAAA..		
CY5+: PA4+	..AAAA.. ?											
PB5+					BBBBBBBBBBBBBBBBBBB							
PA5+										AAAAAA..		

Figure 1. Schedule of partial prealternate (A) and complete prebasic (B) molts of the Western Gull in central California. Mean egg-laying (E), hatching (H), and fledging (F) dates at Southeast Farallon Island are indicated for reference (Spear et al. 1986, Penniman et al. 1990). CY1, first calendar year; CY5+, fifth and subsequent calendar years, etc.; PA1, PB5+, etc., first prealternate, fifth and subsequent prebasic molts, etc. See Table 1 for ranges of starting and ending periods for each molt. Note that molts in CY1 and CY2 birds are only about two months earlier than in CY5+ and that with age prealternate molts appear to become shorter.

"adult" birds. We categorize our observations temporally as early (1–10th), mid (11–20th), or late (21st to end) in the month. Documentary photographs were taken of representative birds of each age class throughout the year. No birds were captured or individually marked.

We supplemented our sample from these two sites with opportunistic observations of birds from other areas in coastal California, from Sonoma to Monterey counties. Howell made incidental observations of *L. o. wymani* (approximately 100 CY1, 150 CY2, 80 CY3, 20 CY4, and 100 "adults") in May, August, and September 1997 and in February and November 1998 in Baja California, Mexico. In *wymani* molt may average slightly earlier than in *occidentalis*, although there is much overlap. We also examined freshly dead corpses for signs of active molt, as well as specimens at the California Academy of Sciences, to cross-check our field observations.

Given the wide range of variation in hybrid Western × Glaucous-winged (*L. glaucescens*) Gulls (Bell 1996), some of which are virtually indistinguishable from pure Western Gulls, it may be impossible to be certain of the purity of our sample. We restricted our observations, however, to birds that showed all characters of pure Western Gulls and, in summer, during the main period of prebasic molt, Glaucous-winged Gulls and their hybrids are rare in central California (pers. obs.).

In terms of anatomy, we use "mantle" to refer to the interscapular area only and "subscapulars" to refer to the four longest scapulars, i.e., those that

appear most posterior on a standing bird and are tipped boldly with white on adults and older immatures. Primaries (P) are numbered distally, i.e., the innermost primary is P1, the outermost P10. References to secondaries do not include the tertials, and greater, median, and lesser coverts refer to secondary coverts only.

RESULTS

Our study revealed that molt in immature Western Gulls is an almost continual process and that drawing lines on such a continuum is problematic. At first we attempted to fit our observations into the conventional framework of molt sequences, with a progression from juvenal to first basic to first alternate to second basic plumages, etc., with the second prebasic molt involving the first replacement of flight feathers (e.g., McCaskie 1983, Grant 1986). We soon encountered an inherent problem with this approach, however, and consequently we simply recorded the sequence and extent of molt as it happened, then attempted to interpret our observations. We found it most convenient to view molts as partial or complete, and here we describe the molt cycles of birds over their first four years of life.

Considerable individual variation, combined with potential overlap of successive molts, made it difficult to fit all birds into clearly defined categories. For example, the last stages of the first partial molt in April appeared to overlap with the start of the first complete molt, while the second partial molt appeared to start before the first complete molt had finished. Generally, partial molts appeared to occur largely within the span of scapular molt (which may not always be complete, however), while complete molts occurred largely within the span of primary molt.

Molt Cycles and Timing

Calendar year 1. Juveniles fledged (e.g., from Southeast Farallon Island) mostly during August (Spear et al. 1986), when they appeared commonly on the mainland coast of central California, with the first few birds in late July. The first signs of molt out of juvenal plumage were in late August (but mainly from mid September onward), with the appearance of new mantle and scapular feathers that often had very broad pale buff to pale cinnamon tips, giving some birds pale, almost leucistic-looking patches in their back; the pale tips soon wore off to reveal mostly gray-brown feathers. The subscapulars often appeared contrastingly fresh relative to the rest of the juvenal plumage and, together with the longest primaries, appeared to be the last juvenal feathers to become fully grown. Molt out of juvenal plumage then progressed through the mantle and scapulars as well as the head, neck, chest, and flanks. By late October, 75% of 91 birds had molted 50–60% (range 0–80%) of the visible scapular area, together with much of the head, foreneck, chest, and flanks. Molt continued through November and into December, by which time 80% of 57 birds had replaced 70–80% (range 10–90%) of their visible scapular area, most to all of the mantle, and much of the head, neck, chest, and flanks. The longest, underlying scapulars, including the subscapulars, were still juvenal plumage, as was the belly and often the

hindneck. There was no molt of upperwing coverts (nor, apparently, of underwing coverts), tail coverts (nor, apparently, of the rump), or flight feathers (including tertials) up to the end of CY1.

Calendar year 2. Molt continued slowly through the same areas from January to April or May, with juvenal feathers continuing to be replaced. Some of the mantle feathers replaced earliest had faded and appeared pale gray, suggesting the appearance of new feathers, but close-range views and examination of dead birds showed these feathers to be very abraded. Conversely, a few fresh gray feathers appeared on the mantles of some birds from late January onward. Molt continued through the scapulars into April and May, and some birds replaced most of their remaining juvenal scapulars during this period. The last scapulars to be replaced were generally the largest, underlying feathers and the subscapulars. These late-grown scapulars were often relatively dark, grayish or mostly gray, and fairly uniform, in contrast to the browner, faded, and more strongly patterned scapulars acquired months earlier.

The first bird we saw with a new subscapular was in early March, but not until April and May did many birds have one or more new fully grown subscapulars. The replacement of subscapulars in April and May corresponded with the completion of replacement of most or all juvenal scapular, mantle, head, neck, chest, and flank feathers. Birds at this time still had the belly mostly or entirely juvenal, and some showed scattered juvenal feathers elsewhere, especially on the hindneck. On some birds, however, the longest scapulars and subscapulars were not replaced until June or later.

The first complete molt started in early April when we noted the first bird with shed inner primaries, although not until late April and May did the majority of birds commence primary molt. By mid May, 78% of 37 birds had shed P2 or 3 (range 0–4), and by late May all birds had shed inner primaries. Also in April, birds started to drop median upperwing coverts and tertial coverts. In May and June, molt progressed quite rapidly and extensively, with most to all of the median upperwing coverts, most greater and many lesser upperwing coverts, some tertials, and many of the mantle and scapular feathers being renewed by late June; also by late June, most to all of the juvenal belly had been replaced. Most birds showed some to many new feathers in the chest, neck, and head, while one or two very "retarded" birds still retained a few very worn juvenal feathers in the neck. By mid June, 60% of 20 birds had shed P6 or 7 (range P5–8), with P1–4 new and P5 or 6 growing; no molt of tail or secondaries was noted through June.

Molt of rectrices started in early July: anywhere from the central pair to all but the outermost pair were shed almost synchronously, though with an overall inner to outer sequence, and a few birds appeared to have dropped the whole tail at once. Growth of rectrices was fairly rapid, and by mid to late August most birds had new apparently full-grown tails.

Molt of the secondaries started with the outermost feather in early to mid July, typically just after the initiation of rectrix molt, and continued inward, at times with groups of feathers shed almost simultaneously. By late August, a few birds had completed growth of new secondaries, but most completed this in September. The outermost primaries grew in fully between early

September and late October (mainly from late September to mid October). Thus the first complete molt extended from April to October, preceded by a protracted partial molt from late August through April or May (Figure 1).

Before the complete molt was finished, about 30% of 40 birds in mid to late August had shed and were growing new median upperwing coverts (i.e., replacing the feathers previously molted from April to June). The percentage of birds with replaced or newly growing median coverts increased to 67% (n = 21) by late October, although we detected with certainty no molt in other tracts by this period. The new incoming median coverts varied from patterned brownish (much like the surrounding upperwing coverts) in early molting birds to unmarked gray (in strong contrast to the other upperwing coverts) in late molting birds. By late November at least 80% of birds (n = 23) had replaced median coverts and molt of these feathers appeared to have ended. The ratio of birds with new brown to new gray median coverts was about 50:50, and the replaced feathers ranged from a group of a few to most of the inner or outer coverts, with no apparent pattern of replacement. Few if any birds replaced all of their median coverts. In November we also noted birds with scattered new gray lesser upperwing coverts, as well as new feathers in the face and, apparently, the mantle and shorter scapulars; one bird also had replaced two inner greater upperwing coverts and its tertials with new grey feathers. This partial molt continued slowly through December in the head, mantle, and scapulars.

Calendar year 3. Molt continued at variable rates in the scapulars, mantle, head, neck, chest, and sides through April and probably into May, by which time all birds appeared to have replaced most feathers in these areas. Usually, a few old scapulars were retained, and we saw no subscapulars replaced in this molt. We also detected no molt of belly, rump, tail coverts, or wing coverts during this period. Thus, the extent of this protracted partial molt was similar to that in the previous year, but often this molt also included some median and lesser upperwing coverts. Interestingly, the incoming plumage typically comprised variably dusky clouding on the head, neck, and chest, so the white-headed "second summer" plumage came about largely through wear and bleaching of these feathers.

Inner primaries started to be shed from late April through late May, along with median upperwing coverts and tertial coverts, signaling the start of the second complete molt. Molt continued through the summer, much like that in the previous year, although averaging slightly later. For example, by mid May, 76% of 34 birds had shed P2 or 3 (range 1–4), and by mid June, 75% of 20 birds had shed P5 or 6 (range P3–7), with P1–3 new and P4 or 5 growing. Tail molt started from early to late July, and by early to mid September almost all birds had fully grown new tails. Secondary molt started in mid to late July and largely ended in mid or late September. The belly was mostly replaced by mid June, although a few birds retained brownish belly feathers into early July. Traces of new dusky markings on the head and neck first appeared in mid June (about when P7 was shed). This second complete molt finished with full growth of outermost primaries between early October and early November.

The first bird noted with renewed molt of median coverts was in late

August; by mid September 20% of 24 birds had growing or newly replaced median coverts, increasing to about 50% of 21 birds by mid to late October. Through November we detected no molt in other tracts, but detecting any change, e.g., from gray to gray in the scapulars or wing coverts, would have been difficult.

Calendar year 4. From the previous December through at least February or March, the mantle, scapulars, head, and neck underwent a molt much like that in CY3. Molt was harder to detect than in younger age classes because of the greater similarity of old and new feathers and the old feathers' being less worn, relatively, because of a shorter period between molts. Therefore we were unable to distinguish at what point the third partial molt ended. A few birds also replaced one or two inner greater coverts and up to four or five additional median coverts during December and January.

The third complete molt (into definitive plumage) started with the dropping of inner primaries and median upperwing coverts from mid May to mid June and continued in apparently the same sequence as did the complete molts during CY2 and CY3, although averaging later in the year. For example, by mid May 55% of 18 birds had not started primary molt (range P0–2 shed), and by mid June molt of primaries in six birds had reached only P2–4 shed, with P1–2 new and/or growing. Tail molt and secondary molt started from late July to mid August. The first traces of new dusky markings on the head and neck appeared in late July (about when P7–8 were shed).

This third complete molt appeared to finish with full growth of the outermost primaries between mid October and early to mid November; however, once the tail had been shed, distinguishing CY4 birds from adults became problematic, and accurate determination of the timing of completion of molt in this age class should await study of birds of known age.

Gray scalloping acquired on the head from late July through September was often so fine that it was hard to see; presumably it could wear off quickly, leaving the head and neck white. Thus determining the timing and extent of any partial winter–spring molt of the head and underparts on birds in definitive plumage is almost impossible without in-hand examination.

The first birds with dropped median coverts were noted in late September, and three birds in mid October showed active median-covert molt. After this time, we could not age birds confidently to determine subsequent molt in this age class.

Calendar year 5 and after. The percentage of cleanly white-headed "adult" birds increased from around 50% in early January (n = 50) to 95% by early March (n = 50), although we could not ascertain how much molt, as opposed to wear, was responsible for this change. At least some scapulars were molted over the winter, from January (and probably December) through February or later, and a few birds also replaced some inner greater and median upperwing coverts during this period, i.e., much like those in CY4.

The complete molt of adult-plumaged birds started between mid May and early July, this span presumably reflecting variation in the birds' age and breeding status. Limited data on known breeding adults (from SE Farallon Island and Bodega) indicated that primary molt of breeders started between

early June and early July (i.e., after eggs had hatched). Larger samples may reveal some breeders starting primary molt even earlier, as has been found in the Herring, Lesser Black-backed (*L. fuscus*) (Ginn and Melville 1983), and Glaucous-winged Gulls (Verbeek 1993).

This definitive prebasic molt started with the shedding of median upperwing coverts, tertial coverts, and inner primaries and apparently progressed much as in other age classes, although distinguishing generations of white head and body feathers generally was not possible. In mid May, 82% of 27 birds had not yet dropped primaries (range 0–2 shed), and by mid June, 90% of 20 birds had shed P1–3 (range 0–3). Tail molt and secondary molt started from mid August to late September. Faint dusky markings appeared on the heads and necks of some birds in mid or late August (about when P7–8 were shed), while others at the same molt stage had apparently fresh, almost glossy white head feathers, with no trace of dusky markings. In September, up to 75% of 50 birds showed dusky markings on their head and neck, and in October at least 90% of 50 birds had such markings, which varied from light scaling (hard to see except at close range) to moderately heavy dusky mottling and streaking. This complete molt finished with full growth of outermost primaries between early November and late December, although most birds had fully grown outer primaries by early December.

The first adults with dropped median coverts were noted in early October, and birds with active median-covert molt were noted through December. We were unable to detect molt in other tracts because the change would be largely from gray to gray and from white to white feathers, almost all of which were relatively fresh at this time. Whitening of the heads appeared largely due to wear through December, and by January up to 50% of adult-plumaged birds appeared white headed (see above).

Molt Sequence

While field observations allow molt to be followed in large numbers of birds, they do not allow critical data to be taken for all areas of a bird. For example, we were unable to determine the exact timing and extent of molt of the rump or underwing coverts, areas generally hidden when birds are perched; in addition, molt of tail coverts was often difficult to ascertain. Nonetheless, some general observations can be made on the sequence of feather molt in the Western Gull, and this same overall sequence appears broadly similar in several other species of large gulls (pers. obs.; Howell et al. 1999). Judicious collecting of specimens or recapture of known individuals could help refine our review of molt sequence.

Typically, the first partial molt started with the shorter scapulars and mantle feathers, followed by the sides of the chest and the lores, and proceeded through the head, neck, chest, and flanks. The last feathers to be molted were usually those of the hindneck and the longest scapulars. No wing coverts, tail coverts, flight feathers, or, apparently, belly and rump feathers were replaced. Subsequent partial molts often started with the median upperwing coverts (often dropped almost simultaneously, or with the outermost feathers dropped first), followed by the scapulars and mantle

feathers, and ended with the head and longest scapulars. In second and subsequent partial molts, some upperwing coverts (especially the median coverts) were often, but not invariably, replaced, and some scapulars also may not always be replaced. The subscapulars appeared to be replaced in partial molts only by some birds in CY2, but their growth and replacement was protracted and often appeared asynchronous, so it is possible that some individuals of older age classes replace one or more subscapulars during partial molts.

Complete molts started with the median upperwing coverts, inner greater upperwing coverts (especially the tertial coverts), and inner primaries. Body feathers followed (including the belly, fairly early on) as lesser and greater upperwing coverts and tertials were replaced. Often the median coverts were dropped almost simultaneously, along with some tertial coverts, followed by the outer greater coverts and the row of large lesser coverts immediately above the median coverts. The greater coverts continued to be replaced inward while the remaining lesser coverts were molted. Rectrices started to drop when primary molt reached about P7 being shed, and secondary molt started at the same time or shortly thereafter, from the outermost secondary inward. Complete molts ended with the inner secondaries, adjacent to the tertials, some subscapulars, and finally the full growth of the outer two primaries.

DISCUSSION

Timing and Extent of Molt

The conventional view proposed by Dwight (1925) for the Western Gull and repeated with no modification by Pierotti and Annett (1995) is of a partial first prebasic molt from September to November, a partial first prealternate molt during March and April, and subsequent prebasic molts in August and September, followed by partial prealternate molts during March and April. McCaskie (1983) recognized that these molts were more protracted and gave their spans as July to October and February to April.

The molt periods are not as neatly defined as those authors suggested, however, and molt appears to be more or less continuous for at least the first two years of a Western Gull's life. Our observations suggest that approximate molt cycles can be superimposed upon this continuum (Table 1, Figure 1). The first and second partial molts span up to 7 or 8 months, while subsequent partial molts appear to be shorter in duration and perhaps less extensive. Younger birds, which are not breeding, can undergo more prolonged and more extensive partial molts than breeding adults, which have only a short period between finishing their complete molt and starting breeding. The feather quality of first-year birds also may be poorer than that of adults, resulting in the need for a more extensive first partial molt. Complete molts for all ages take 5 or 6 months, as has been reported for the Herring Gull (Pierotti and Good 1994).

The first partial molt generally involves the head, neck, chest, flanks, mantle, and scapulars, while in later molts these feathers and often some median and lesser upperwing coverts are replaced. Trapping live birds, or

Table 1 Approximate Periods of Partial Prealternate (PA) and Complete Prebasic (PB) Molts of the Western Gull in Central California

Molt	Starting period	Ending period
PA1	late Aug–late Oct	Apr–?[a]
PB2	early Apr–late May	early Sep–late Oct
PA2	mid Aug–mid Nov	Apr–?
PB3	late Apr–late May	early Oct–early Nov
PA3	late Aug–?	Mar–?
PB4	mid May–mid Jun	mid Oct–mid Nov
PA4	late Sep–?	Feb–?
PB5+	mid May–early Jul	early Nov–late Dec
PA5+	early Oct–?	Feb–?

[a]See text for problems in determining periods of prealternate molt.

targeted collecting of specimens, could help determine the full extent of partial molts, e.g., whether or not any rump or belly feathers are replaced. Variability in the availability of food and the experience and fitness of foraging birds may mean that not all feathers within a tract are always replaced in a given molt. For example, while all scapulars and median coverts are replaced in every complete molt, they are not necessarily replaced in every partial molt.

The longest scapulars, because of their size, may be the most energetically costly feathers to replace in a partial molt. Because the juvenal subscapulars are replaced for the first time between March and June, or later, it is not possible to determine at what point the first partial molt ends and the first complete molt begins—unless one can know the history of every scapular follicle and how many times it has been activated. That is, by the end of the first complete molt, some scapulars (the shorter feathers) may have been replaced twice, while others (the longer feathers and subscapulars) have been replaced only once.

Molt of the median upperwing coverts may parallel that of the scapulars; i.e., if median coverts replaced in April are not replaced again in the fall through winter, then their replacement in April would pertain to the first complete molt, but if they *were* molted again in fall then their replacement in April might pertain either to the end of the first partial molt *or* to the start of the first complete molt. Because all Western Gulls of all ages replace all of their median coverts from April to June, concurrent with the shedding of inner primaries, we consider (for the purposes of molt terminology) that replacement of median coverts at this time is part of the complete prebasic molt.

Molt Nomenclature

Humphrey and Parkes (1959) proposed a nomenclature (the so-called H–P system) that facilitates an objective study of molt and plumage homologies among all groups of birds, and the H–P system is standard for molt studies

in North American literature. By the H–P definition, the complete molt in adults of all species, usually after breeding, is considered a homologous prebasic molt. Similarly, the first molt that succeeds juvenal plumage has always been considered the first prebasic molt. Following traditional use of H–P terminology, the protracted "postjuvenal" molt of a Western Gull would be a partial first prebasic molt. If, however, one traces the partial–complete–partial–complete molt cycles in a Western Gull back from the complete, definitive prebasic molt to juvenal plumage (Figure 1), the homology of the first partial molt lies with a *prealternate* molt. That is, the first partial molt is similar in timing, duration, and extent to the second prealternate molt, which argues strongly in favor of treating the first partial molt as a prealternate molt. Consequently, there is no partial first prebasic molt in a Western Gull's first year; the molts of first-year Western Gulls are only two to three months ahead of those of adults, and the molting periods converge over three years of predefinitive plumages (Figure 1). The main difference between the first and subsequent partial molts is that the latter often include upperwing coverts. California Gulls (*L. californicus*), however, which have a similar molt strategy to Western Gulls', can replace upperwing coverts in their first partial molt (see below).

That the homology of the first partial molt with a prealternate molt in the Western Gull has been widely overlooked may be attributed to the protractedness of the first partial molt, the continually changing appearance of plumages, and, perhaps, the tradition that fall molts are prebasic, spring molts prealternate. For example, Parkes (1967) noted "we have encountered, thus far, no bird species with two definitive ("adult") plumages per cycle which does not also have two corresponding plumages in its first year." Unless populations were followed over time, however, it would be easy to examine late winter specimens of Western Gulls and assume that any molt was a second molt.

That the same feathers of the same generation may look different on different individuals, depending on the time of year they are replaced, is not widely appreciated, although this phenomenon was demonstrated conclusively for the White Ibis (*Eudocimus albus*) by Kushlan and Bildstein (1992) and has been mentioned for some passerines such as tanagers (Pyle 1997). It could be argued that new gray feathers appearing on the mantle of Western Gulls from late January onwards signify a new molt, and indeed this would be difficult to disprove without detailed study over time of known individual birds. Ongoing observations of the entire molting process, however, lead us to infer that retained juvenal feathers were being replaced by feathers different in appearance (more "advanced") than those grown in during early winter. This hypothesis is supported by observations of molt in the scapulars, in which individual feathers are easier to distinguish than on the mantle. It was clear that scapulars replaced later were often relatively plain and dark grayish, in striking contrast to the strongly patterned brownish scapulars acquired earlier. Regardless of whether these late-molted scapulars pertain to the preceding partial molt or succeeding complete molt, there are at most only two postjuvenile generations of scapulars in a bird's first year, not up to three as would be required for a scenario of partial prebasic, partial prealternate, and complete prebasic molts within this

period. That the first partial molt is almost identical in timing and extent to the second partial molt (Figure 1) also argues against any second partial molt of some feathers late in the first winter, because this has no equivalent in later plumage cycles.

Our reinterpretation is supported by, and also helps explain, the results of Howell et al. (1999), who described the traditional "first prebasic molt" of migrant Herring, Thayer's, and Glaucous-winged gulls wintering in central California. Those authors noted that the juvenal plumage of these species was often retained into midwinter, and that some juvenile Thayer's Gulls in March had not started to molt. Ironically, they asked "do first-year large gulls even have a prealternate molt?" because, given conventional understanding, the first prebasic, first prealternate, and complete second prebasic molts would have to occur after birds left California in April and before they returned in November. Our studies of the Western Gull help solve this problem if, instead, there are simply one partial (prealternate) and one complete (prebasic) molt in this period.

We are aware of two other studies, based on critical observation and examination of specimens, that reached similar conclusions regarding the first-year molt of certain species. For the California Gull, Johnston (1956) noted that the traditional division into first winter (prebasic) and first nuptial (prealternate) molts and plumages was misleading. He concluded that "It would be appear to be more accurate to speak of a first winter molt, involving, for the most part, only the feathers of the upper back [i.e., mantle and scapulars] until February when a rather extensive molt of the body, head, and neck areas commences." Thus, by spring, as in Western Gulls, no feather tracts of California Gulls have been replaced more than once, and subsequent molts follow the cycle of complete prebasic and partial prealternate. Johnston's study predated the advent of H–P terminology, and his conclusions have been overlooked.

We note, though, that "postjuvenile" molt in early fledged California Gulls in central California in fall 1998 tended to be more extensive than described by Johnston (1956), often involving much of the head, neck, chest, and flanks, as on Western Gulls (pers. obs.). On some birds (typically those with the most extensive scapular molt) this molt also included some inner median and greater upperwing coverts. We detected no second molt in spring of any CY2 California Gulls, however, and the changes in appearance of birds in late winter and spring were due largely to feather wear and bleaching.

Kushlan and Bildstein (1992) undertook a careful study of the White Ibis and concluded "the existence of an alternate I plumage is not documented." We suggest the molt strategy of the White Ibis is like that of large gulls, and instead it is a first prebasic molt that is lacking.

The problem of following individuals and populations over time, combined with the variability in feathers of the same generation, has hindered recognition of the molt strategy manifested by the Western and California gulls and the White Ibis. A provisional review suggests that this molt strategy is typical of most (if not all) large gulls and of several large wading birds, including the Black-crowned Night-Heron (*Nycticorax nycticorax*) (Howell, unpubl. data). We encourage a fresh look at molt in nonpasserines and more critical study of their strategies.

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LITERATURE CITED

American Ornithologists' Union. 1957. Check-list of North American Birds, 5th ed. Am. Ornithol. Union, Baltimore.

Bell, D. A. 1996. Genetic differentiation, geographic variation, and hybridization in gulls of the *Larus glaucescens–occidentalis* complex. Condor 98:527–546.

Campbell, R. W., Dawe, N. K., McTaggart-Cowan, I., Cooper, J. M., Kaiser, G. W., and McNall, C. E. 1990. The Birds of British Columbia, vol. 2. Royal Br. Columbia Mus., Victoria.

Dwight, J. 1925. The gulls (Laridae) of the world: Their plumages, moults, variations, relationships, and distribution. Bull. Am. Mus. Nat. Hist. 52:63–408.

Ginn, H. B., and Melville, D. S. 1983. Moult in Birds. BTO Guide 19. Br. Trust Ornithol., Tring, England.

Grant, P. J. 1986. Gulls: A Guide to Identification, 2nd ed. Academic Press, San Diego.

Howell, S. N. G., King, J. R., and Corben, C. 1999. First prebasic molt in Herring, Thayer's, and Glaucous-winged Gulls. J. Field Ornithol. 70:543–554.

Humphrey, P. S., and Parkes, K. C. 1959. An approach to the study of molts and plumages. Auk 76:1–31.

Johnston, D. W. 1956. The annual reproductive cycle of the California Gull I: Criteria of age and the testis cycle. Condor 58:134–162.

Kushlan, J. A., and Bildstein, K. L. 1992. White Ibis (*Eudocimus albus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 9. Acad. Nat. Sci., Philadelphia.

McCaskie, G. 1983. Another look at the Western and Yellow-footed Gulls. W. Birds 14:85–107.

Parkes, K. C. 1967. Prealternate molt in the Summer Tanager. Wilson Bull. 79:456–458.

Penniman, T. M., Coulter, M. C., Spear, L. B., and Boekelheide, R. J. 1990. Western Gull, in Seabirds of the Farallon Islands (D. G. Ainley and R. J. Boekelheide, eds.), pp. 218–244. Stanford Univ. Press, Stanford, CA.

Pierotti, R. J., and Annett, C. A. 1995. Western Gull (*Larus occidentalis*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 174. Acad. Nat. Sci., Philadelphia.

Pierotti, R. J., and Good, T. P. 1994. Herring Gull (*Larus argentatus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 124. Acad. Nat. Sci., Philadelphia.

Pyle, P. 1997. Identification Guide to North American Birds, Part 1. Slate Creek Press, Bolinas, CA.

Spear, L. B., Ainley, D. G., and Henderson, R. P. 1986. Post-fledging parental care in the Western Gull. Condor 88:194–199.

Verbeek, N. A. M. 1993. Glaucous-winged Gull (*Larus glaucescens*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 59. Acad. Nat. Sci., Philadelphia.

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A COMMENTARY ON MOLT AND PLUMAGE TERMINOLOGY: IMPLICATIONS FROM THE WESTERN GULL

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ABSTRACT: The Humphrey–Parkes system of molt nomenclature takes as the starting point of cyclic plumage succession the highly variable molt that replaces juvenal plumage, entailing inconsistency. If all "postjuvenal" molts are called prebasic, homology between so-called first basic and second basic plumages of birds the same age is lost. We suggest that the juvenal plumage be considered synonymous with first basic plumage, and we define the first basic plumage cycle as the period between the acquisition of juvenal (= first basic) plumage and the acquisition of the second basic plumage. Consequently, the traditional first basic plumage of birds with a single molt and plumage per cycle (e.g., Procellariiformes) should be renamed the second basic plumage; that of species with more complex molt strategies should be considered as a variable, inserted plumage not homologous with a basic plumage. In this way, consistent nomenclature for all prebasic molts and basic plumages of all species can be achieved, regardless of whether additional plumages have been inserted into the basic cycle. We define four strategies that incorporate most if not all known molt strategies and show how these build on the primitive basic strategy, taking juvenal (= first basic) plumage as a homologous starting point.

Humphrey and Parkes (1959) proposed a nomenclature (the so-called H–P system) that facilitates an objective study of molt and plumage homologies among all birds. Their far-sighted system remains standard for molt studies in North America, although they acknowledged that "parts of our fundamental thesis [may] need to be altered or broadened" (Humphrey and Parkes 1959: 17). On the basis of our studies of molt in the Western Gull (*Larus occidentalis*) (Howell and Corben 2000), we re-evaluated their molt and plumage nomenclature as applied to large gulls and other large birds in their first year of life. We suggest here a refinement of the H–P system, one that allows for a consistent nomenclature for prebasic molts and basic plumages of all species, regardless of whether or not additional plumages have been inserted into the basic cycle. This consistency is absent from conventional H–P nomenclature, in which equivalent plumages of birds the same age are not always given the same name, as in the disparity between so-called first basic and second basic plumages of birds the same age.

CONVENTIONAL INCONSISTENCY

Particularly in species with alternate plumages, a satisfactory and consistent system for bridging the period between juvenal plumage and definitive basic plumage has been lacking. For example, under conventional terminology, the first complete molt of a Northern Fulmar (*Fulmarus glacialis*) or Red-tailed Hawk (*Buteo jamaicensis*) when about a year old produces a *first* basic plumage, yet the homologous complete molt of a Western Gull produces a *second* basic plumage (Figure 1). American Kestrels (*Falco*

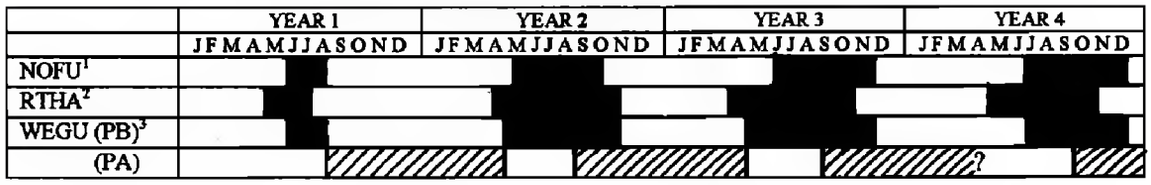

Figure 1. Approximate molting periods over the first four years of life for the Northern Fulmar (NOFU), Red-tailed Hawk (RTHA), and Western Gull (WEGU). Solid blocks, prebasic molt; hatched blocks, prealternate molt. Prebasic molt in the first year (into first basic plumage, as defined here) is the acquisition of juvenal plumage (see text). When molts are viewed in this manner, all second and subsequent prebasic molts can be considered homologous. Data for the fulmar from Cramp and Simmons (1977) and Ginn and Melville (1983), for the hawk from Palmer (1988) and Preston and Beane (1993), for the gull from Howell and Corben (2000).

sparverius) have a partial molt in their first winter, whereas Merlins (*Falco columbarius*) do not (Palmer 1988). Thus a year-old kestrel is undergoing its second prebasic molt while a Merlin of the same age is undergoing its first. Some Glaucuous-winged Gulls (*L. glaucescens*) have an extensive molt in their first winter, while others appear to have no molt of juvenal feathers prior to their complete prebasic molt when a year old (Howell, pers. obs.). Thus the prebasic molt of some year-old Glaucous-winged Gulls is their first while for others it is their second.

This discord is contrary to one of the H–P system's four criteria for a semantically clean terminology for plumage and molt: "the nomenclature must be consistent" (Humphrey and Parkes 1959: 14). Yet while all of the species noted above have fundamentally similar molt strategies (Figure 1), the nonhomologous terminology has not been questioned. We suggest this inconsistency can be remedied.

DEFINITIONS

We follow Humphrey and Parkes (1959: 24) in supposing that "plumages were not originally sexually, seasonally, or developmentally dimorphic" and that "primitive or ancestral plumages were most likely renewed periodically and completely by protracted molts." Similarly, we believe it reasonable to consider the ancestral molt strategy to be the simplest possible, similar to that manifested today by birds such as the Procellariiformes (e.g., Northern Fulmar) and most Falconiformes (e.g., Red-tailed Hawk), which have only a single (i.e., basic) plumage per cycle. This we term the *primitive basic strategy*. We consider the molts present in the primitive basic strategy to be present in all species and believe these are the only molts that should be considered prebasic. Any other molts in species with more complex strategies should be considered as additions to the primitive basic strategy.

A key point here is the definition of "basic plumage," a term coined by Humphrey and Parkes (1959:15) for the *adult plumage* that is "almost invariably lost and renewed by a complete molt." From this adult basic plumage Humphrey and Parkes worked *backward* to juvenal plumage without critically addressing the issue of what has been called first basic plumage.

Concerning the prebasic molt, then, Humphrey and Parkes (1959: 15) stated "although complete in 'adults,' this molt may be either complete or partial in young birds undergoing postjuvenal feather replacement." Thus they regarded any "postjuvenal" molt as a prebasic molt, whether partial, incomplete, or complete. For birds with a primitive basic strategy (e.g., Procellariiformes; Figure 1) this is logical, but Humphrey and Parkes (1959) provided no explanation why any molt immediately following juvenal plumage should be a prebasic molt, especially in birds with more than one plumage per cycle. Presumably they considered that any development of plumages should start from a basic plumage, a premise with which we agree in principle.

Thus the H–P system takes its starting point as the attainment of first basic plumage, effectively naming a plumage (first basic) after the molt that introduces it. This is contrary to other H–P usage, in which the name of a molt is derived *from* the plumage it produces. Having a highly variable "postjuvenal" molt as the starting point immediately introduces inconsistencies in comparisons of plumage homologies: if all "postjuvenal" molts are called prebasic molts, homology between so-called first basic and second basic plumages of birds the same age is lost.

A critical point in evaluating plumage homologies should be a consistent and workable definition of a bird's *first basic cycle*, yet this seems not to exist. Viewing plumages and molts in terms of cycles is an extremely powerful means of interpretation. Humphrey and Parkes (1959: 3) explained that a "cycle ... is to be understood as a shortened version of 'plumage cycle;' a cycle (in an adult bird) runs from a given plumage or molt to the next occurrence of the same plumage or molt." Therefore, a cycle could be viewed as a basic cycle (i.e., between basic plumages) or an alternate cycle (i.e., between alternate plumages), but in either case the cycle also includes other cyclic phenomena in a bird's life, such as breeding and migration. The H–P cycle was defined in terms of an individual adult bird, but it can also be considered largely synonymous with the cycle of a species or population whose members share a common breeding season, as in the great majority of temperate-zone species, in which case "cycle" is synonymous with annual cycle.

Obviously, the starting point in life is not repeated in a cyclic manner for an individual bird, yet this event is a fundamental part of the cycle of all species. We suggest that the first basic plumage cycle can be defined as the period between the attainment of juvenal plumage and the acquisition of the next basic plumage via a complete, or nearly complete, molt that corresponds to a molt present in the primitive basic strategy (see Figure 2). This is in accord with the H–P definition of a cycle, and this first cycle then becomes comparable among all species in the same way that a definitive plumage cycle is comparable. As a rule, the first basic cycle has a duration similar to the definitive basic cycle.

THE PROBLEM OF "FIRST BASIC"

Under the H–P system, some species have a complete so-called "first prebasic molt" within a few months of hatching. At first sight these molts appear homologous with the definitive prebasic molt because they produce

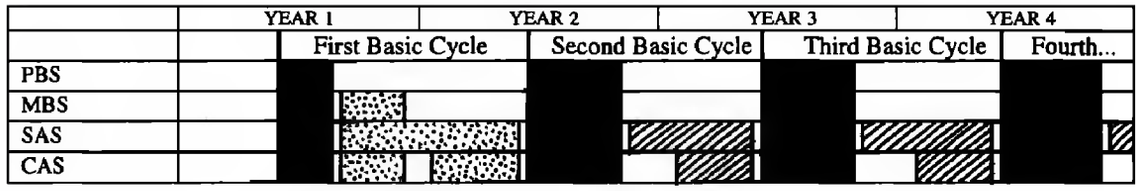

Figure 2. Diagrammatic representation of molt strategies that build on the primitive basic strategy (PBS): the modified basic strategy (MBS), simple alternate strategy (SAS), and complex alternate strategy (CAS). Solid blocks, prebasic molts; stippling, molts inserted into the first cycle; hatching, prealternate molts in the second and subsequent cycles. See text for further explanation of these strategies. Note that a basic cycle extends from the acquisition of one basic plumage to the acquisition of the next.

a similar-looking plumage. Complete molts are not necessarily prebasic, however, and before naming any complete molt one should examine the molts of closely related species and also consider how a molt fits into a species' life history.

In *Calidris*, for example, the "postjuvenal" molt is incomplete to complete in the Little Stint (*C. minuta*), partial to incomplete in the Red-necked Stint (*C. ruficollis*), and partial in the Western Sandpiper (*C. mauri*) (Prater et al. 1977, Cramp and Simmons 1983). Thus the traditional "complete first prebasic molt" of a Little Stint is simply one end of a continuum rather than homologous with the adult's complete prebasic molt. Passerines with traditional "complete first prebasic molts" are generally species whose habits entail a high degree of feather wear, e.g., the Wrentit (*Chamaea fasciata*) in chaparral or the European Starling (*Sturnus vulgaris*) nesting in cavities. In some cases, the "postjuvenal" molt varies from partial to complete within a single species, e.g., the Phainopepla (*Phainopepla nitens*; Pyle 1997), providing a strong argument that this molt is not homologous with the definitive complete prebasic molt but instead reflects an adaptation to environmental conditions.

Consequently we suggest there is no good reason to call any "postjuvenal" molt within the first cycle a prebasic molt, no matter how much the resulting plumage may resemble the definitive basic plumage. When the first basic cycle is defined as we have done, all so-called "first prebasic molts," other than those of species with a primitive basic strategy, can be viewed as inserted into the first basic cycle (see Figure 2).

Understandably, perhaps, the similarity of these molts and plumages to those of the adult has masked their homology, but the H–P system was developed to allow the recognition of homologies independent of preconceptions derived from characters such as the appearance of a plumage or the season of its acquisition.

CONSISTENT BASIC HOMOLOGIES

There are two options for aligning terminology among all species. The first is to consider the complete prebasic molt at the end of a bird's first cycle always to be the first prebasic molt, as done currently for a Northern Fulmar or Red-tailed Hawk. This would involve major upheaval in terminology for all

species with alternate plumages (e.g., many Anseriformes, Charadriiformes, and Passeriformes). The second option is to call the complete molt at the end of the first cycle a second prebasic molt, as is done presently for species with inserted plumages. This would require a change in terminology for species following the primitive basic strategy (e.g., Procellariiformes and most Falconiformes). We believe that the molt strategy of a Western Gull suggests a logical approach to resolving this problem.

Howell and Corben (2000) described the molt cycles and sequences of the Western Gull in California and concluded that from a bird's first fall into spring it undergoes only a single protracted molt; there is no evidence that any feathers are replaced more than once. By comparison with the adult cycle, this first partial molt of a Western Gull, out of what is traditionally termed juvenal plumage, appears homologous with a prealternate molt, not with a prebasic molt as has been previously thought (Figure 1; also see Figure 1 of Howell and Corben 2000). Other large gulls and large wading birds also follow this strategy (Johnston 1956, Kushlan and Bildstein 1992). Presumably it had been overlooked because the single molt is protracted, the appearance of feathers of the same generation can vary with time of replacement, and, perhaps, the tradition that fall molts are prebasic, spring molts prealternate (Howell and Corben 2000).

If one considers the Western Gull's first partial molt a first prealternate molt, it follows that its juvenal plumage could be considered equivalent to a first basic plumage. This may seem radical, but there is logic in a terminology for plumage succession that starts with the young bird rather than with the definitive prebasic molt of an adult. Beyond inferring the synonymy of the juvenal and first basic plumage from the Western Gull, we offer the following arguments in favor of this proposal.

At the most fundamental level, juvenal plumage is a bird's first "basic" plumage, although it may not have been defined strictly as such. In some orders (e.g., Sphenisciformes, Gaviiformes, Procellariiformes), the so-called juvenal and subsequent basic plumages are remarkably similar, supporting their homology. Selective pressures operating differently on different species, however, could modify the juvenal plumage greatly. In the Passeriformes, the juvenal plumage of most species can be viewed as a highly modified first basic plumage, perhaps a "quick and dirty" plumage to get immobile, vulnerable young out of the nest.

Juvenal plumage is also attained by a complete molt (the traditional prejuvenal molt), completeness being the single unifying characteristic of homologous prebasic molts recognized by the H–P system. The molt into juvenal plumage occurs, by necessity, via a more temporally compressed and more synchronous process than for subsequent basic plumages.

Juvenal plumage is widely defined as the plumage in which a bird fledges, and all authors have agreed that juvenal plumage among most if not all birds is comparable. For this reason, juvenal plumage was taken by Humphrey and Parkes (1959) as the starting point for the development of basic plumages. We have simply reinterpreted the starting point. It is somewhat paradoxical that in proposing a system to disconnect terminology from a bird's life cycle, Humphrey and Parkes purged the term "adult" and replaced it with "definitive" yet retained the terms "juvenal" and "juvenile," perhaps

the most fundamental links with a bird's life cycle. Instead, it might have been quite logical to start by calling the juvenal plumage a first basic plumage. We suspect, though, that the spell of traditional nomenclature, which the H–P system sought to replace, was too strong for this homology to be recognized. Our reinterpretation of first basic plumage is simply a validation of the flexibility and utility of the H–P system.

If juvenal plumage is considered equivalent to a first basic plumage, then traditional second basic plumage for all species with inserted plumages can still be termed second basic plumage. In species following the primitive basic strategy, however, the traditional first basic plumage (acquired when the bird is one year old) needs to be renamed the second basic plumage, and so on. This is a relatively minor change, yet it allows for a system of consistent nomenclature for all prebasic molts and basic plumages of all species, regardless of whether additional plumages have been inserted into the basic cycle (Figures 1, 2). That is, plumages are numbered in reference to the cycle in which they occur, so that the fourth basic plumage of one species will always be comparable to the fourth basic plumage of any other species.

If so desired, the traditional juvenal plumage can still be called "juvenal" (and birds in this plumage "juveniles"), but it should be recognized as *synonymous with first basic plumage*, so that it can be followed by prealternate and/or presupplemental molts.

MOLT STRATEGIES

Following juvenal (i.e., first basic) plumage, a bird molts however necessary to get through its first basic cycle and enter into a cycle like that of an adult. While the variety of "postjuvenal" molts may seem overwhelming, all molt strategies involving plumages inserted into the first cycle are variations of three fundamental patterns of plumage development that build upon the primitive basic strategy of a single prebasic molt per cycle (Figure 2).

The Modified Basic Strategy. Many species, especially passerines (e.g., Corvidae, Vireonidae), have a unique molt and plumage inserted into the first basic cycle (the traditional first prebasic molt and first basic plumage) but no inserted molt in the adult cycle (Figure 2). This molt ranges from being limited to a few feathers to complete.

The Simple Alternate Strategy. This is the strategy of large gulls and some wading birds, in which the single inserted molt of the first cycle appears homologous with the prealternate molt of the adult cycle (Figure 2).

The Complex Alternate Strategy. In some cases two molts and plumages have been inserted into the first cycle (e.g., most small gulls, *Calidris* sandpipers): the traditional first basic and first alternate plumages (Figure 2). The inserted molts in such cases usually involve a partial to, rarely, complete molt, followed by a partial molt. Exceptionally, three molts may be inserted into the first cycle, as in the Indigo Bunting (*Passerina cyanea*; Rowher 1986).

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LITERATURE CITED

Cramp, S., and Simmons, K. E. L. (eds.). 1977. Handbook of the Birds of Europe, the Middle East, and North Africa, vol. 1. Oxford Univ. Press, Oxford, England.

Cramp, S., and Simmons, K. E. L. (eds.). 1983. Handbook of the Birds of Europe, the Middle East, and North Africa, vol. 3. Oxford Univ. Press, Oxford, England.

Ginn, H. B., and Melville, D. S. 1983. Moult in Birds. BTO Guide 19. Br. Trust Ornithol., Tring, England.

Howell, S. N. G., and Corben, C. 2000. Molt cycles and sequences in the Western Gull. W. Birds 31:38–49.

Humphrey, P. S., and Parkes, K. C. 1959. An approach to the study of molts and plumages. Auk 76:1–31.

Johnston, D. W. 1956. The annual reproductive cycle of the California Gull I: Criteria of age and the testis cycle. Condor 58:134–162.

Kushlan, J. A., and Bildstein, K. L. 1992. White Ibis (*Eudocimus albus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 9. Acad. Nat. Sci., Philadelphia.

Palmer, R. S. 1988. Handbook of North American Birds, vol. 5. Yale Univ. Press, New Haven, CT.

Prater, A. J., Marchant, J. H., and Vuorinen, J. 1977. Guide to the Identification and Ageing of Holarctic Waders. Br. Trust Ornithol., Tring, England.

Preston, C. R., and Beane, R. D. 1993. Red-tailed Hawk (*Buteo jamaicensis*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 52. Acad. Nat. Sci., Philadelphia.

Pyle, P. 1997. Identification Guide to North American Birds, Part 1. Slate Creek Press, Bolinas, CA.

Rowher, S. A. 1986. A previously unknown plumage of first-year Indigo Buntings and theories of delayed plumage maturation. Auk 103:281–292.

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NOTES

FIRST RECORD OF YELLOW-BROWED WARBLER (*PHYLLOSCOPUS INORNATUS*) IN NORTH AMERICA

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For many years I have had an interest in the autumn migration in western Alaska's islands. In addition to a single fall visit to Attu Island, in the western Aleutians, in 1993, I have been able to visit Gambell, Saint Lawrence Island, in early fall 1992 (six days in late August), 1997 (seven days in late August), 1998 (16 days, through early September), and 1999 (45 days, 20 August to 3 October). Fay and Cade (1959) and Sealy et al. (1971) made detailed censuses on Saint Lawrence Island, primarily in summer, during the 1950s and 1960s. Birders have visited Gambell regularly during the late spring (late May and early June) since the mid-1970s. My extended stay in 1999 was highlighted by the discovery of a number of Asian strays, including the Long-toed (*Calidris subminuta*) and Temminck's (*C. temminckii*) stints, multiple Common Ringed (*Charadrius hiaticula*) and Mongolian (*C. mongolus*) plovers, a *Cuculus* cuckoo (probably the Oriental, *C. saturatus*), Siberian Accentor (*Prunella montanella*), and Little Bunting (*Emberiza pusilla*). I also noted a moderate number of strays from mainland Alaska, a number of late departure dates for the western part of the state, and a few record high counts, particularly of several seabirds.

The most unusual species I found in 1999 was North America's first Yellow-browed Warbler (*Phylloscopus inornatus*), which was present 23–24 September. The bird frequented two of Gambell's three "boneyards," a habitat characterized by disturbed nutrient-rich ground that supports a lush growth of a mintlike vegetation, which, by late summer, grows to a height of up to a foot or so. In contrast to the very short tundra vegetation and extensive gravel found elsewhere around Gambell, this boneyard vegetation acts as a magnet to many species of passerines, both regular migrants and vagrants.

The following description of the Yellow-browed Warbler is copied from my field notes, written both days the bird was present. On 23 September: "First seen hover-gleaning food off dense, low mint vegetation in 'far boneyard,' then quickly disappeared, and then flushed and dove back into cover. My first impression was of either a large kinglet or a smallish *Phylloscopus*. The bird also seemed a bit brighter and more contrasty above, and smaller overall, than a typical Arctic Warbler would look. Then began a 3-hour session as I chased the bird around the north end of the boneyard, getting many looks at it in flight and quick looks of it on the ground between long periods when it was buried in the vegetation. Or there would be periods of up to 30 minutes during which I could not refind it at all or would leave it alone so that it would filter back into its favored area before I would flush it again. Managed to take one mediocre [poor] photo of it today. Did not hear it call.

A smallish *Phylloscopus*, clearly smaller than a typical Arctic Warbler (*P. borealis*), but just slightly longer looking (but slimmer bodied) than a kinglet, with a shorter, finer bill than an Arctic Warbler, with a pale base to the lower mandible. Crown a gray-green, with the rear crown and upper nape showing a pale (dirty whitish or grayish white) skinny line—a partial median crown stripe. Back and rump a pretty unmarked medium pure greenish, almost a "moss green"; the back and rump were the same color, showing no contrast [contra Pallas' Warbler, *P. proregulus*]. Upperside of tail tinged greenish but duller than rump. Bold straight pale supercilium tinged pale yellow (not strong yellow) and bordered below by a thin dark eyeline. Wings showed two

wingbars, a bold lower bar (formed by tips to greater coverts) that was whitish tinged yellow and a shorter and narrower upper bar that looked whitish. There were distinct broad whitish edges to the tertials—at least three—repeatedly seen. These edges were accentuated by the darkness of the tertial feather centers, which were the darkest feathers on the wing. Overall the wing was rather contrasty looking—more so than in the Arctic Warbler—and this effect was visible a number of times even when the bird was in flight. The underparts were a whitish color throughout, perhaps with a faint dusky color on the sides of the breast. The legs and feet were a dusky color of some sort throughout, not black and not distinctly pale (i. e., not yellow or fleshy). The bird acted quite nervous at times, and was seen several times to flick its wings, kinglet fashion."

Additional details from 24 September: "Bird still present. Many repeated brief but good views again in far boneyard. Light became good at times as well. Today I was able to get some 20 photos of the bird (Figure 1). Pale yellow of supercilium easier to see in some lights than in others. Bird seen flicking its wings on numerous occasions. Incredibly, a Ruby-crowned Kinglet (*Regulus calendula*) [casual on the island] appeared 30–100 feet away for about 5 minutes or so. Overall size of the Yellow-browed Warbler and kinglet almost the same, the Yellow-browed being possibly just a tad longer, if any, and body sleeker, not as pot-bellied as the kinglet (which appeared slightly puffed up in the 37° F temperatures). Then, had stunning views of the warbler in the evening, when it moved a relatively short distance to the "circular boneyard." A couple of fine details now noted: the pale yellow supercilium pales at the rearmost section to an off white and appears either to stay straight or to curve upward slightly. And, the flight feathers (secondaries and base of primaries) are thinly edged with dull yellowish, as are the tail feathers."

I identified the bird as a Yellow-browed Warbler after my first good view of it (a minute or two after first glimpsing it). I had seen numbers of the species previously in Asia (China, Malaysia), as well as numbers of Hume's Leaf-Warblers (*P. humei*) (in China, plus single individuals in Holland and Israel) and a single Pallas' Leaf-Warbler in China. Hume's and Pallas' leaf-warblers are the most similar species, sharing the small size and distinct white tertial edges. Pallas' is eliminated by its head pattern (bolder overall, with a much more distinctive median crown stripe) and by its showing a contrasting yellowish rump. Hume's is eliminated by the Gambell bird's brighter and more contrasty plumage, moss-green upperparts, distinct upper wingbar, pale yellow rather than dull buff supercilium, and very blackish tertials. Hume's was formerly considered a subspecies of the Yellow-browed but was recently split as a separate species (see Alstrom and Olsson 1988). Other species of olive wing-barred *Phylloscopus* that breed in northeastern Asia, including the Arctic Warbler, Greenish Warbler (*P. trochiloides*), Pale-legged Leaf-Warbler (*P. tenellipes*), and Eastern Crowned Leaf-Warbler (*P. coronatus*), are eliminated by their larger size, details of head pattern, and, especially, by their lack of white edges to the tertials (Vaurie 1959, Baker 1997, Mullarney et al. 1999).

The Yellow-browed Warbler has a huge breeding range in Russia, where it is "one of the commonest Siberian birds" (Dement'ev and Gladkov 1954). It breeds in coniferous, mixed, and low birch, willow, and poplar woodlands from the Ural Mountains east all the way to the western Anadyr Basin, the northern Sea of Okhotsk, and Ussuriland in eastern Siberia, south to Mongolia, northern Manchuria, and (probably) northern Korea. It winters mostly in southeast Asia, from India east to southeast China and the Malay Peninsula (Dement'ev and Gladkov 1954, Vaurie 1959, Baker 1997). Hume's Leaf-Warbler has a more southerly breeding distribution, in southern and central Asia east to central China (Dement'ev and Gladkov 1954, Vaurie 1959, Baker 1997).

The Yellow-browed Warbler has been anticipated in Alaska (e.g., Balch 1980, Roberson 1988). It is a regularly occurring vagrant from Siberia to Britain and

Figure 1. North America's first Yellow-browed Warbler (*Phylloscopus inornatus*) at Gambell, St. Lawrence Island, Alaska, 23–24 September 1999. Note the pale yellow wash to the supercilium, greenish upperparts, grayer green crown, yellowish edgings to the flight feathers, and, especially, the bold white edges to the blackish tertials.

Photo by Paul Lehman

elsewhere in western Europe in the late fall. Cottridge and Vinicombe (1996) termed it "the commonest Siberian vagrant to western Europe," and noted that an average of just under 100 individuals occur there annually, with at least 615 birds found in 1985.

That this species had not been found in Alaska until now may be at least partly the result of the limited autumn coverage of the islands of the Bering Sea. Some vagrant species, such as the Middendorff's Grasshopper-Warbler (*Locustella ochotensis*) and Little Bunting, are more likely to occur in Alaska during the fall than during the spring. The Yellow-browed Warbler may be another example.

This record of the Yellow-browed Warbler has been accepted by Alaska authorities as the 457th species known to have occurred in that state (D. D. Gibson, *in litt.*, 1 November 1999).

LITERATURE CITED

Alström, P., and Olsson, U. 1988. Taxonomy of Yellow-browed Warblers. Br. Birds 81:656–657.

Baker, K. 1997. Warblers of Europe, Asia, and North Africa. Princeton Univ. Press, Princeton, N.J.

Balch, L. G. 1980. A brief guide to the identification and status of Asian species in Alaska. Birding 12:12–22.

Cottridge, D., and Vinicombe, K. 1996. Rare Birds in Britain and Ireland: A Photographic Record. HarperCollins Publishers, London.

Dement'ev, G. P., and Gladkov, N. A. (eds.). 1954. Birds of the Soviet Union. Vol. VI. 1968 translation by Israel Program for Scientific Translations, Jerusalem.

Fay, F. H., and Cade, T. J. 1959. An ecological analysis of the avifauna of St. Lawrence Island, Alaska. Univ. Calif. Publ. Zool. 63:73–150.

Mullarney, K., Svensson, L., Zetterström, D., and Grant, P. J. 1999. Collins Bird Guide. HarperCollins, London.

Roberson, D. 1988. The ten most likely additions to the ABA Checklist. Birding 20:353–363.

Sealy, S. G., Bedard, J., Udvardy, M. D. F., and Fay, F. H. 1971. New records and zoogeographic notes on the birds of St. Lawrence Island, Bering Sea. Condor 73:322–336.

Vaurie, C. 1959. The Birds of the Palearctic Fauna: Passeriformes. H. F. & G. Witherby, London.

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UNUSUAL FORAGING STRATEGY BY THE GREATER ROADRUNNER

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The Greater Roadrunner (*Geococcyx californianus*) feeds on a remarkable diversity of animals including rodents, birds, reptiles, and arthropods (Hughes 1996). Often the species demonstrates surprising adaptability in acquiring prey: individual roadrunners have been observed capturing insects by turning over surface objects (Jaeger 1947), hiding near artificial feeders to take hummingbirds (Spofford 1975), and removing passerines from mist nets (Barclay 1977).

At approximately 0800 on 4 August 1998, while hiking near the mouth of Sabino Canyon, Tucson, Arizona, I witnessed an adult roadrunner chasing band-winged grasshoppers (*Trimerotropis* sp.) on a rarely used paved access road. Though I have witnessed roadrunners foraging on numerous occasions, I have never seen a roadrunner active for so long a time. Over a period of approximately 1 hour, the bird serially rushed upon grasshoppers resting on the pavement. Hunting bouts lasted between 5 and 10 minutes with the roadrunner standing and resting on the pavement for 1 or 2 minutes between bouts. Its hunting path followed the east–west direction of the road, and the bird moved continually away from my position in a zigzag manner. In most instances the roadrunner rushed several meters toward a resting grasshopper, attempting to capture it on the ground. If unsuccessful, it sometimes made an additional capture attempt after the grasshopper took flight. Of the 150 capture attempts that I counted, the roadrunner was successful 22 times, for a success rate of about 15%.

On most capture attempts the roadrunner lowered its head and ran directly toward each grasshopper, then snapped at the insect with its mandibles. If it missed, the roadrunner would visually follow the insect for 1 or 2 seconds and occasionally lunge a final time while the prey was airborne. Captured grasshoppers were bitten 3 to 6 times, then tossed a few centimeters in the air, caught in the mandibles, and swallowed.

The band-winged grasshoppers in this observation possessed a mottled and speckled pattern consisting of the colors tan, rufous, white, and gray that made them next to impossible to see when they were resting on the desert soils of the region. On the dark gray paved roadway, however, the grasshoppers were quite conspicuous and could be easily censused. They were unusually abundant with about one grasshopper per 2 m^2 of road surface. I assumed that the grasshoppers were attracted to the pavement in the relatively cool early morning hours because of its warmth.

On natural terrain the roadrunner typically captures a band-winged grasshopper after it has accidentally startled the insect (pers. obs.). The grasshopper immediately takes flight, whereupon the roadrunner lunges for the insect in midair or captures it on the ground after it has landed. The roadrunner does not appear to see a grasshopper until it moves—as suggested by roadrunners often making misdirected initial capture motions.

The presence of this, and perhaps other, paved roadways can allow roadrunners to develop a novel, more direct, foraging strategy for hunting grasshoppers. This is significant since grasshoppers are one of the roadrunner's most important food resources (Bryant 1916, Parmley 1982).

LITERATURE CITED

Barclay, J. S. 1977. Roadrunner takes birds from mist net. Bird-banding 48:280.

Bent, A. C. 1940. Life histories of North American cuckoos, goatsuckers, hummingbirds and their allies. U. S. Natl. Mus. Bull. 176.

Bryant, H. C. 1916. Habits and food of the roadrunner in California. Univ. Calif. Publ. Zool. 17:21–50.

Hughes, J. M. 1996. Greater Roadrunner (*Geococcyx californianus*), in The Birds of North America (A. Poole and F. B. Gill, eds.), no. 244. Acad. Nat. Sci., Philadelphia.

Jaeger, E. C. 1947. Stone-turning habits of some desert birds. Condor 49:171.

Parmley, D. 1982. Food items of roadrunners from Palo Pinto County, north-central Texas. Tex. J. Sci. 34:94–95.

Spofford, S. H. 1976. Roadrunner catches hummingbird in flight. Condor 78:142.

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BOOK REVIEWS

Colorado Breeding Breeding Bird Atlas. Hugh E. Kingery, editor. Illustrated by Radeaux. 1998. Co-published by Colorado Bird Atlas Partnership and Colorado Division of Wildlife. 636 pages. 16 pages with color photographs. Line drawings. Hardbound, $39.95. ISBN 0-9668506-0-2.

A fact-filled tome at 600 pages, the Colorado Breeding Bird Atlas is a must-have for anyone interested in atlasing and is required reading for anyone interested in the breeding distribution and biology of the 265 species of birds that breed in Colorado. It includes chapters on Colorado ecosystems, post-settlement changes to Colorado habitats, Colorado ornithologists, and color photographs of Colorado habitats, nests, nestlings, fledglings, and biogeographic regions. For each species, the atlas provides a breeding phenology table that lists specific dates or date ranges for nest building, occupied nest, nest with eggs, nest with young, feeding young, and fledged young. The cover has beautifully stylized artwork, and the Habitat Division of the Colorado Division of Wildlife prepared the individual species' maps.

The book provides a wealth of information on Colorado's breeding birds including 13 previously unknown breeding species, although five of the latter are probably one-event instances. Of the other eight new breeders, two were real surprises: the Bufflehead and Northern Waterthrush in North Park. The atlas turned up new information on the range of common breeding birds like House Finches expanding their range onto the plains and Gray Catbirds nesting in as many blocks on the western slope as on the eastern slope of the Rocky Mountains.

The atlas project, assisted by Audubon chapters, bird clubs, and government wildlife agencies in Colorado, surveyed the state for breeding birds from 1987 to 1994. Over 1170 people participated, sampling blocks three miles on a side, one in each 7.5-minute topographic map in Colorado, and the book explains the data turned in from the resulting 1745 blocks.

The species accounts were written by 30 Colorado atlasers who interpret the information gathered by this massive effort and also give insight into the species' past and future. It is no surprise, with so many volunteers in the field, that incomplete findings and mistaken identifications were reported, and the volunteers' range of field abilities presented problems. The editors and account authors had to identify such problems, and they or other experienced atlasers revisited blocks that had errors or had been only partially worked by previous atlasers.

In any book of this scope, there are problems at the publishing stage. One confusing feature on the maps that accompany each species account is that the number of dots (entries) on the map is frequently very different from the number of entries listed in the caption for that map under breeding evidence. For example, the caption for the Eared Grebe lists 4 possible, 3 probable and 12 confirmed nestings in priority blocks, but the map below the caption shows 8, 4 and 21 entries, respectively. For the Canvasback the caption says 2 possible, 3 probable, and 2 confirmed nestings, but the map shows 3, 1, and 6, respectively. The answer to this discrepancy is found on page 38, which explains that the maps include nonpriority-block data while the tables reflect only priority-block data. Apparently, where there were three probable Canvasback nestings, there must have been two additional confirmed nestings in an adjacent nonprority block on the same topographic map. Technically this is not a flaw, but since it occurs on most maps the discrepancy should have been addressed with a footnote to each map. Once explained, the maps and their captions make sense.

In total, the atlas gives more information on statewide breeding status than the best information previously published in the long out-of-print *Birds of Colorado* by Bailey and Niedrach (Denver Mus. Nat. Hist. Press, 1965) and the more recent *Colorado*

Birds by Andrews and Righter, (Denver Mus. Nat. Hist. Press, 1992.) The best testimonial, besides accolades from Coloradoans, is that the atlas has already found its way on to tables at agency and resource-planning meetings—one main reason it was undertaken.

Bruce Webb

Bird Songs of the Rocky Mountain States and Provinces, by Robert Righter and Geoffrey A. Keller. 1999. Library of Natural Sounds, Cornell Laboratory of Ornithology. Set of 3 cassettes (ISBN 0-938027-45-X), or 3 compact disks (ISBN 0-938027-43-3). Price $29.95.

This set of recordings covers an impressive variety of vocalizations from 259 bird species characteristic of the Rocky Mountain states and provinces—from the Horned Grebe to Hepatic Tanger, Mountain Plover to McCown's Longspur. The species are arranged in AOU (1998) sequence, and cuts were compiled from the work of 47 sound recordists. An accompanying booklet provides context for most calls and gives the location of each recording (at the state level only). In addition, and something I find useful, is that the booklet includes written transcriptions for each vocalization and often articulates helpful comparions for distinguishing songs, sounds, and calls from similar species, e.g., the various woodpeckers' drumming.

The selection of species is somewhat eclectic, presumably reflecting the material available, but most if not all regional specialities are represented, such as the Sage Grouse (including the disjunct Gunnison population), both prairie-chickens, and all three rosy-finches. "Mundane" species are not ignored, which is nice, including the Northern Shoveler and Ruddy Duck—the latter sounds like it was displaying directly into the microphone! One can make useful comparisons between the Clark's and Western grebes, Trumpeter and Tundra swans, or Bohemian and Cedar waxwings. All four North American breeding swifts are included, as are songs and calls of all four longspurs. The recordings range from good to excellent and seem not to have been edited excessively for "purity" of sound. Thus the vocalizations sound "natural," with other species sometimes audible in the background, but always softly and not interfering with the main subject.

For most species more than one type of vocalization is included, usually distinguished in the booklet as song or call. In some cases the recordings were made outside the region, as in Alaska or New York, while the Golden Eagle was a captive bird from Scotland. The geographic provenance of vocalizations touches on an issue that I would like to see treated more critically by series of recordings, or even of photographs: exact location and date are much more informative than simply "Alaska" (e.g., song of Fox Sparrow) or "Venezuela" (call of Red-eyed Vireo). Such data make the recordings far more useful—birds may sing away from the breeding grounds, and different subspecies can sound quite different. For example, multiple subspecies of Fox Sparrow occur in Alaska, and the variation in this species' songs and calls is just beginning to be appreciated. In such cases, noting the exact location and/or relevant subspecies would be helpful.

Another comment that might be addressed by a reprinting is that, while the geographic area covered is presumably intuitive for the authors, a simple map would help those of us less familiar with western North American geography. This would also give potential buyers an idea of how useful the recordings might be for an area they plan to visit. These minor recommendations aside, the compilers are to be congratulated on a first-rate product, and anyone interested in the vocalizations of North American birds would do well to own a copy of these sound recordings.

Steve N. G. Howell

FEATURED PHOTO

IDENTIFICATION OF TAIGA AND BLACK MERLINS

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The Merlin (*Falco columbarius*) is a small circumboreal falcon with nine currently recognized subspecies, three of which occur in North America: the pale Prairie Merlin (*F. c. richardsonii*) of the northern Great Plains, the Black Merlin (*F. c. suckleyi*) of the Pacific Northwest, and the widespread and medium-hued Taiga Merlin (*F.c. columbarius*), the paler western component of which was once considered a fourth subspecies, *F. c. bendirei* (American Ornithologists' Union [AOU] 1957). Migration is highly variable, some birds being resident, others long-distance migrants (Palmer 1988); the winter range extends from southern coastal Alaska to Newfoundland (mostly in cities) across most of the U.S. to northern South America (AOU 1998). Taiga Merlins account for the majority of North American wintering birds outside of areas occupied by resident Prairie and Black Merlins. The featured photo on the back cover shows four female Merlins housed at the Natural History Museum of Los Angeles County (109178, 110767, 109383, 107885 left to right), each collected in southern California since 1993. The three left birds show predominantly *suckleyi* characters, yet all but 109838 were originally labeled *F. c. columbarius*, prompting this review. Some of the marks touched upon here may often be imperceptible under field conditions, but with patience, practice, and good fortune, observers may be surprised at the possibilities for close study; this may be particularly true of *suckleyi*, which often seems naive on its winter grounds (Schmitt pers. obs.).

All specimens of *suckleyi* are blackish brown above with heavy, dark streaking below. Adult males show a slaty cast to the upperparts (visible only under ideal circumstances) and are often perceptibly smaller than adult females (with experience or in direct comparison). Also, in comparison with female *suckleyi*, males tend to be more sparingly marked through the face, nape, and underparts, thus appearing more like *columbarius*. Adult females and young of *suckleyi* are extremely similar, with considerable overlap in color and markings. Adults' uppertail coverts usually show heavy black shaft streaks and pale tipping, but the most consistent difference among adults is that, in *suckleyi*, the dark rachis nearly or completely divides the white tail tips (see the left two birds in the featured photo).

Adult males of *columbarius* are variably blue-gray above, while adult females and immatures are brown, often a warm tone but seldom matching the "dark chocolate" appearance of typical female/immature *suckleyi*. Adult females and immatures of *columbarius* are very similar, though the adults often show a grayish cast above, especially on the rump and uppertail coverts; and, as on adult *suckleyi*, their uppertail coverts have well-defined black shaft streaks and pale tips.

The underparts of most specimens of *suckleyi* are more dark than light, with a blush of rich buff across the breast that is fairly prominent when fresh. Bar components to the blackish brown streaking yield a blurry or mottled appearance, and these bold breast markings together with mostly dark auriculars serve to accentuate the whitish throat, which is finely to moderately streaked. Breast streaking on *columbarius* is medium brown, often with a rufous cast in good light, and strongly marked individuals are about equally dark and light below. The throat of *columbarius*, though generally more lightly streaked than that of *suckleyi*, shows less contrast against the moderately streaked breast, paler buff wash across the upper breast, and paler auricular that is often darker toward the rear, with a faint or modest moustache mark;

thus, the throat of *columbarius* does not draw attention as does that of *suckleyi*. The throat contrast of *suckleyi* is a field mark particularly valued by hawk-watchers since it is visible from a considerable distance (Schmitt pers. obs.).

As shown by the second bird from the left, the sides and flanks of *suckleyi* are blackish brown, often with large white spots that yield a barred appearance; such marks are usually reduced and paler on *columbarius*. The leg feathers and undertail coverts of *suckleyi* normally have obvious dark shaft streaks or even teardrop markings, with partial bar components to the streaking of the distal two or three undertail coverts. Most specimens of *columbarius* have more narrowly streaked leg feathers and narrowly or unstreaked undertail coverts. These feather tracts are often obscured on perched birds but can be seen in the featured photo.

On *suckleyi*, whitish (to bluish) tail bands or spots are often limited to the inner webs, with any pale markings on the outer webs generally limited to spots near the rachis; as a result, these marks are usually visible on the ventral surface (see left three birds in featured photo), while the dorsal surface often appears uniformly dark unless the tail is spread. Though pale tail markings may be vague, we have never encountered a specimen completely lacking them. The subterminal dark tail band of *suckleyi*, like that of adult male *columbarius*, is significantly wider than the adjacent dark band, while these bands are of nearly equal width in female and young *columbarius*. Because of this difference, the undertail coverts of *suckleyi* normally cover all but two or three light bands in the folded tail, while those of *columbarius* allow three or four light bands to show. On some specimens of *columbarius* (and virtually all of *richardsonii*) the subterminal brown band is darker than those above it, a contrast lacking in the darker tail of *suckleyi*. As shown by the left two birds, the white rectrix tips of adult *suckleyi* are usually split by the dark rachis, while in *columbarius* and young *suckleyi* the tips are usually unbroken white, although the dark shaft streak may reach the end of the tail in some cases.

In flight, the wing-linings of *suckleyi* appear blackish with white spotting, rather than a more neutral "checkerboard" pattern in *columbarius*. Similarly, the remiges of *suckleyi* appear dark brown with buff spots or "dashes" toward their bases, while the flight feathers of *columbarius* show pale barring that extends to the tips. As one might imagine, these markings can be very difficult to perceive on a flying Merlin, but they can be useful with practice, concentration, and circumstance.

As touched upon previously, the auriculars of *suckleyi* are typically dark, setting off the whitish throat, and the crown is blackish. Strongly marked individuals often exhibit a strikingly "hooded" head pattern, with a thick moustachial mark that may evoke a diminutive Peregrine Falcon (*F. peregrinus*). Nominate *columbarius* normally has paler auriculars, and the crown is brown on females and immatures. Pale nuchal mottling, sometimes said to form a "false face" on the nape of *columbarius*, is greatly reduced or lacking on typical *suckleyi*. Finally, while especially dark *suckleyi* may nearly lack a pale supercilium, there seems to be overlap with *columbarius* in this respect (Schmitt pers. obs.).

It bears emphasizing that Merlins are variable, perhaps to the point where no migrating or wintering individual can be identified to subspecies with utter confidence. Not only do some individuals exhibit intermediate characters (e.g., Clarke and Wheeler 1987), but birds showing the "classic" features of a given subspecies may originate from well outside the known range implied by those features (cf. Snyder and Snyder 1991, p. 190, the sobering image of an exceedingly pale adult male Merlin photographed at a nest in Alaska). Therefore, while the information in this article should help observers to recognize and document Taiga and Black Merlins more confidently, we cannot even state with certainty that the specimens in the featured photo are correctly identified! Thus, we recommend prefacing such pronouncements with the phrase, "a Merlin showing the characteristics of...."

Our thanks go out to Jerry Ligouri for a cogent and timely review, and to Kimball L. Garrett of the Natural History Museum of Los Angeles County for his cheerful assistance with the specimens considered here.

LITERATURE CITED

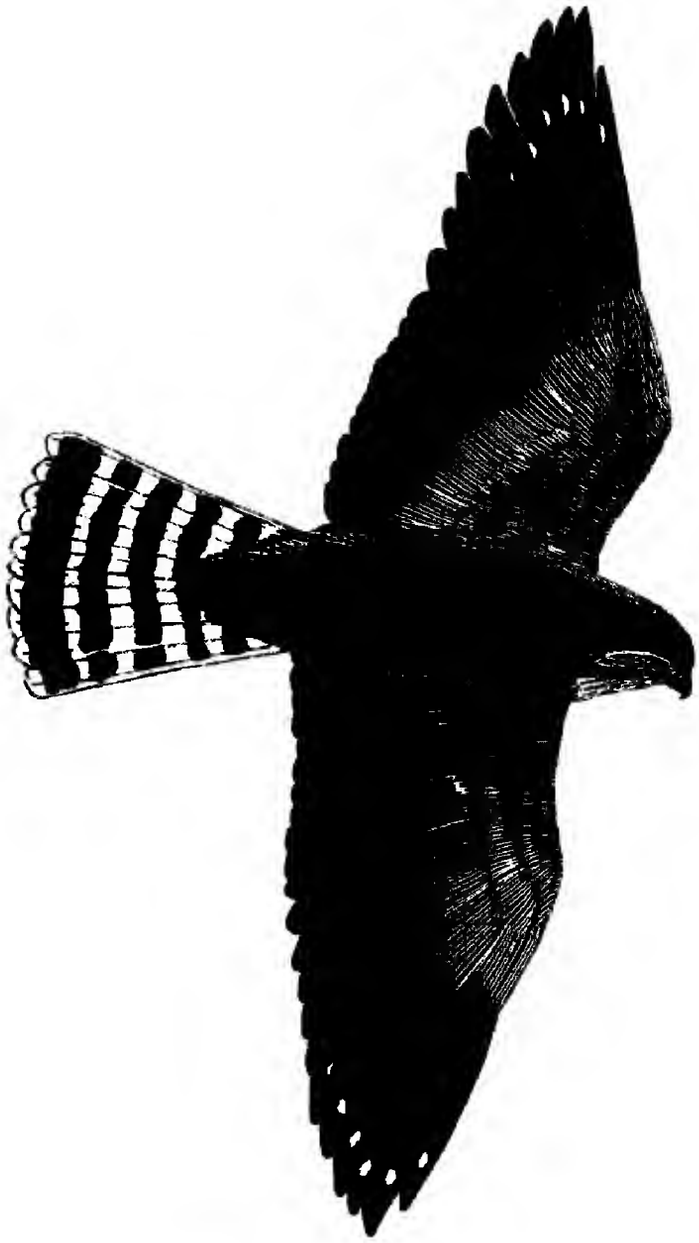
American Ornithologists' Union. 1957. Check-list of North American Birds, 5th ed. Am. Ornithol. Union, Baltimore.

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Clark, W. S., and Wheeler, B. K. 1987. A Field Guide to Hawks, North America. Houghton Mifflin, Boston.

Palmer, R. S. 1988. Handbook of North American Birds, vol. 5. Yale Univ. Press, New Haven, CT.

Snyder, N. F., and Snyder, H. A. 1991. Birds of Prey: Natural History and Conservation of North American Raptors. Voyageur Press, Stillwater, MN.



Merlin

Sketch by George C. West

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5–9 July 2000, Kernville, Kern County, California

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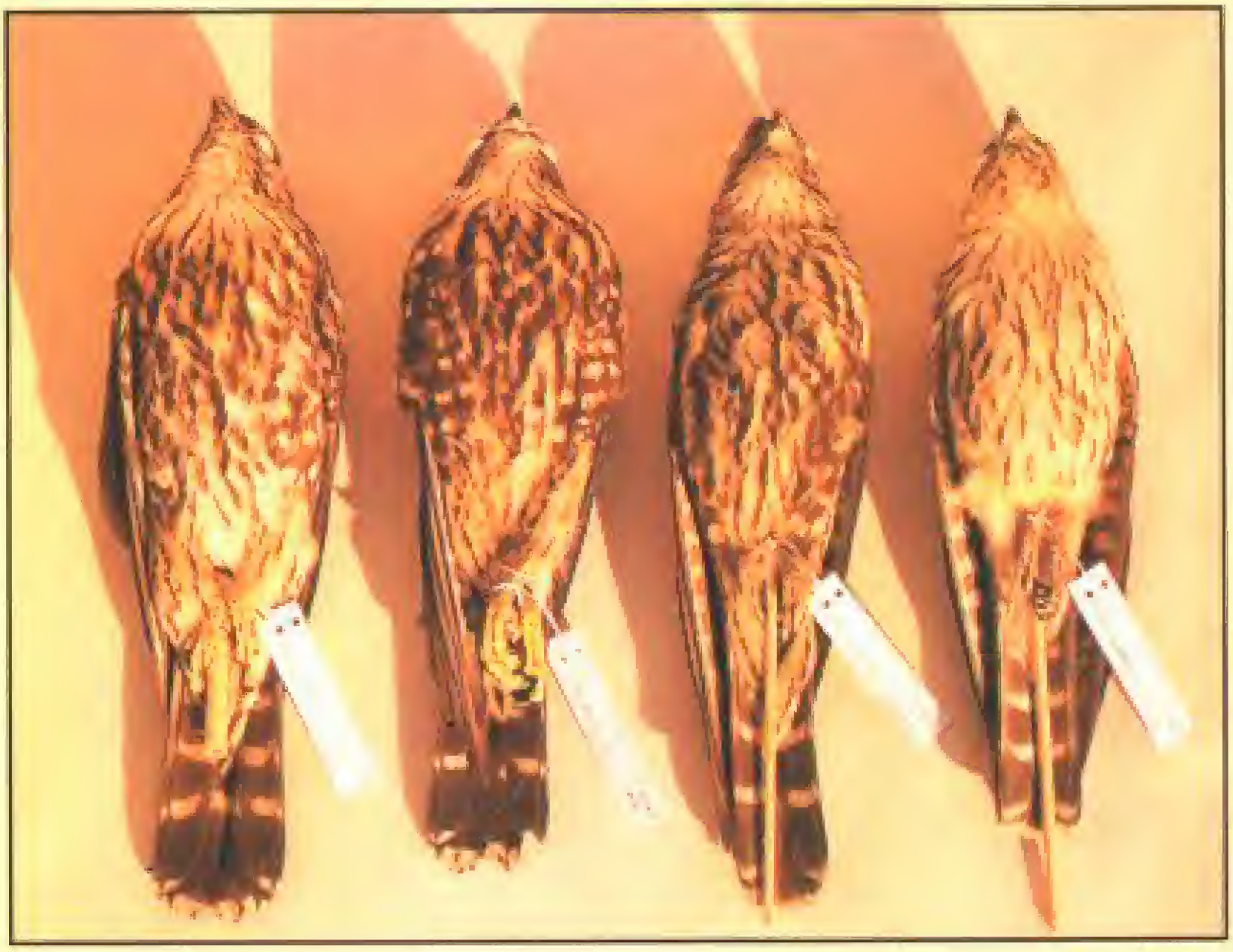

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Cover photo © by Don DesJardin of Ventura, California: Dusky-capped Flycatcher (*Myiarchus tuberculifer*), Ventura, California, December, 1998.

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WESTERN BIRDS

Volume 31, Number 2, 2000

SEABIRD ABUNDANCES OFF WASHINGTON, 1972–1998

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BILL TWEIT, P. O. Box 1271, Olympia, Washington 98507

ABSTRACT: Twenty-seven years of observations revealed changes in seabird abundance associated with changes in oceanographic conditions and ocean productivity. The regime shift of 1976, El Niño of 1983–1984, and the prolonged decline in productivity of the 1990s were followed by great declines in several historically common species, particularly those foraging offshore: the Sooty Shearwater, a nonbreeding visitor from the southern hemisphere, and three alcids breeding regionally, the Common Murre, Cassin's Auklet, and Tufted Puffin. Species that increased included two offshore foragers associated with fishing vessels (Black-footed Albatross and Northern Fulmar), one inshore-foraging species that nests in southern California and Mexico (Brown Pelican), and an apparently adaptable alcid (Rhinoceros Auklet) that forages inshore and has increased all along the west coast of North America. The decrease of eight offshore species and two abundant widespread species coinciding with an increase in three fishing-vessel associates and two nearshore foragers imply a decline in oceanic productivity.

The distribution at sea of seabirds off western North America has been described primarily since the late 1960s. Most of our knowledge results from studies of the impacts of oil transportation and development (see Briggs et al. 1987, 1992), cruises on research vessels (e.g., Sanger 1972, Wahl et al. 1989, Morgan et al. 1991, Ainley et al. 1995b, Veit et al. 1997), and opportunistic observations from whale- or bird-watching trips (e.g., Ainley 1976).

Seabird distribution off Washington was described anecdotally by Jewett et al. (1953) and, after more systematic offshore vessel surveys, by Sanger (1965, 1970, 1972), Wahl (1975, 1984), Wahl and Heinemann (1979), Wahl et al. (1993), and, from aircraft surveys, by Briggs et al. (1992).

In late 1971 Wahl began systematic seabird censuses during one-day seabird-watching cruises from Grays Harbor on the southwest coast of Washington (Figure 1). These cruises sampled habitats from the shallow estuary channel entrance at Westport over the outer continental shelf out to the nearest deepwater indentation, Grays Canyon, about 50 km offshore. The study area is 40–90 km from the nearest seabird nesting colonies. It

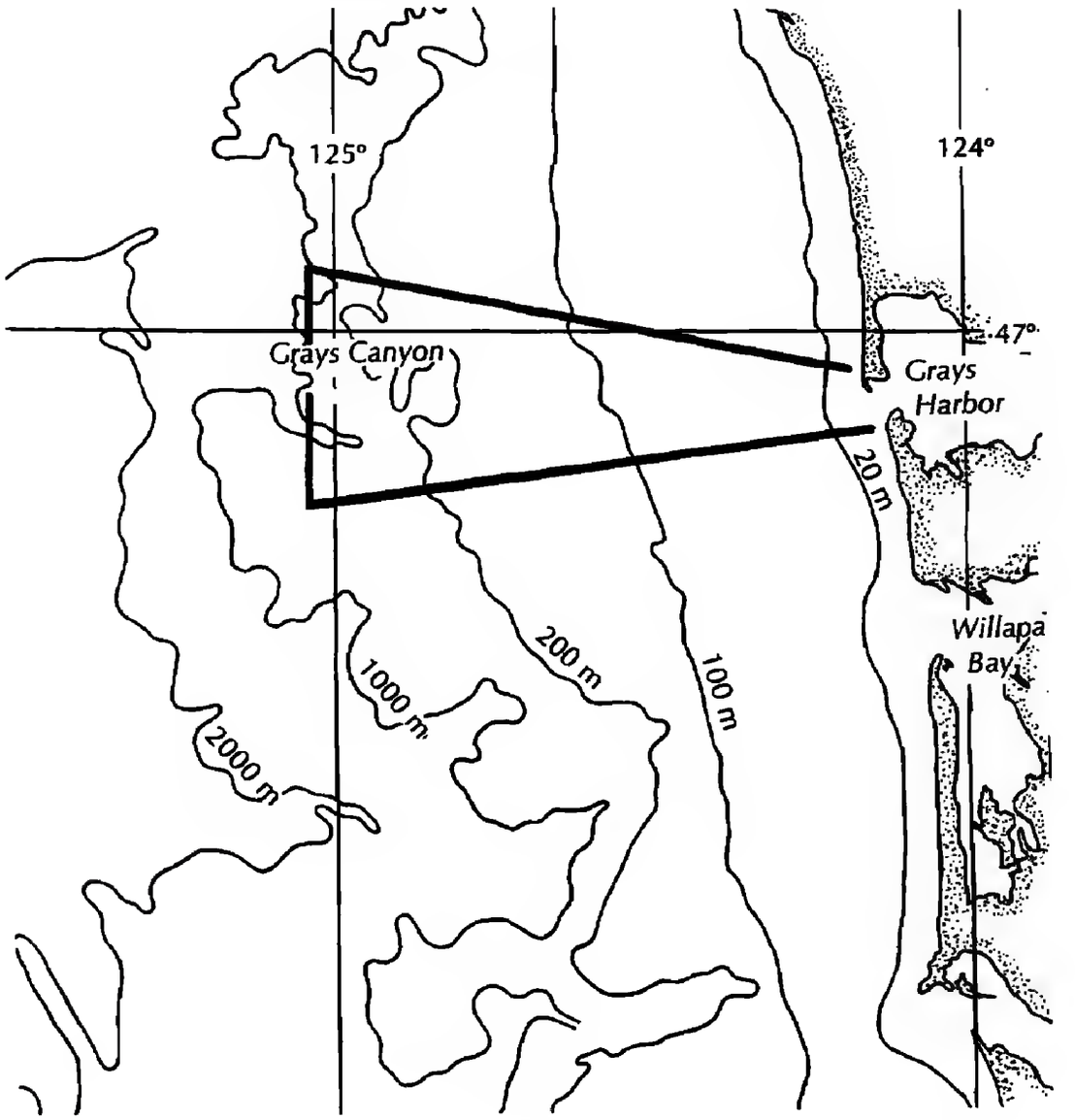


Figure 1. Study area off Grays Harbor, Washington.

includes nearshore waters, the gently sloping inner shelf, outer shelf area, and the periphery of the California Current offshore (Favorite et al. 1976). Sampling effort, mostly during the July–October southbound migration season, increased over time (Table 1).

We use data from 226 trips from 1972 through 1998 to show variation in numbers of birds observed and changes in abundance by species. We attempt to summarize those data with reference to several questions. What levels of year-to-year variability are apparent? Are long-term trends in abundances evident? Did variations in abundances of seabirds observed reflect local or widespread oceanographic events?

METHODS

Data Collection

Trips were made aboard chartered vessels 14–20 m long. The observer's eye level above the sea surface was about 3–4 m. We used a scheme of

Table 1 Census Effort off Grays Harbor, Washington, July–October

Year	Number of trips	Number of censuses	Distance covered (km)
1972	6	106	939
1973	5	78	616
1974	4	59	514
1975	5	84	765
1976	4	71	662
1977	7	137	1094
1978	6	119	882
1979	7	145	1071
1980	6	105	789
1981	4	68	505
1982	8	158	1138
1983	6	124	833
1984	10	208	1501
1985	9	170	1224
1986	7	142	989
1987	10	206	1363
1988	9	190	1224
1989	9	182	1129
1990	13	235	1516
1991	12	242	1564
1992	12	245	1597
1993	11	227	1491
1994	13	267	1760
1995	11	221	1496
1996	11	203	1389
1997	10	198	1361
1998	11	208	1456
Total	226	4398	30,736

periods of approximately 30 minutes during which two observers estimated numbers of all birds and other animals seen at all distances from both sides of the vessel. Time periods and transect lengths were controlled by depth contours. Grays Harbor channel was one census, and censuses from there were then stopped and started at depths of 20 m, 50 m, 100 m, 200 m, 1000 m, and 2000 m. Location, sea-surface temperature, sea and observation conditions were recorded for each period. In general, observation conditions were consistent because seasonal weather was comparable and the vessels' size restricted trips to relatively good weather and sea conditions (Beaufort sea state was 0–3 on 91% of censuses; swell height was <3 m on 95%). Vessels in the vicinity that were seen to be attracting birds were visited, and birds were chummed during stops at the most offshore location, at about 125° W longitude. Counts of birds at vessels and chum stops were separated from numbers recorded while our vessel was in motion (see Wahl and Heinemann 1979). Birds attracted to our vessel were counted when first observed but not (knowingly) thereafter. Corrections were not made for directions and speed of bird flight relative to our vessel (see Tasker et al. 1984, Spear et al. 1992, van Franeker 1994, Garthe and Hüppop 1999).

Observation efforts were consistent. All but 37 of the 226 trips had at least two primary observers, with Wahl, Tweit, D. R. Paulson, or B. LaBar present on 218 trips and at least two of them on most. The same vessel was used for 138 of 145 July–October trips from 1985 through 1998. We necessarily compromised between showing birds to birdwatchers who paid for vessel charters and rigid systematic censusing: we were compelled to look at and attempt to identify any animal encountered, regardless of distance.

Analysis

We used data for 24 "species" regularly found in the study area from July to October (Table 2): phalaropes, identified and unidentified as to species, were combined, as were the Western and Glaucous-winged gulls. Two- or three-month periods were used for seven species (Table 2) that were virtually

Table 2 Seasons (July–October) and Habitats of Seabirds off Washington

Species	Season[a]	Habitat[b]
Black-footed Albatross, *Phoebastria nigripes*[c]	Jul–Oct	O
Northern Fulmar, *Fulmarus glacialis*[c]	Jul–Oct	O
Pink-footed Shearwater, *Puffinus creatopus*[c]	Jul–Oct	O
Flesh-footed Shearwater, *P. carneipes*[c]	Jul–Oct	O
Buller's Shearwater, *P. bulleri*	Sep–Oct	O
Sooty Shearwater, *P. griseus*[c]	Jul–Oct	ON
Fork-tailed Storm-Petrel, *Oceanodroma furcata*	Jul–Sep	O
Brown Pelican, *Pelecanus occidentalis*	Jul–Oct	N
Phalaropes, *Phalaropus* spp.	Jul–Sep	ON
South Polar Skua, *Catharacta maccormicki*	Jul–Oct	O
Pomarine Jaeger, *Stercorarius pomarinus*	Jul–Oct	ON
Parasitic Jaeger, *S. parasiticus*	Jul–Oct	ON
Long-tailed Jaeger, *S. longicaudus*	Aug–Sep	O
Heermann's Gull, *Larus heermanni*	Jul–Oct	N
California Gull, *L. californicus*[c]	Jul–Oct	ON
Western/Glaucous-winged Gull, *L. occidentalis/glaucescens*[c]	Jul–Oct	ON
Black-legged Kittiwake, *Rissa tridactyla*	Jul–Oct	N
Sabine's Gull, *Xema sabini*	Aug–Oct	O
Arctic Tern, *Sterna paradisaea*	Aug–Sep	O
Common Murre, *Uria aalge*	Jul–Oct	ON
Marbled Murrelet, *Brachyramphus marmoratus*	Jul–Oct	N
Cassin's Auklet, *Ptychoramphus aleuticus*	Jul–Sep	O
Rhinoceros Auklet, *Cerorhinca monocerata*	Jul–Oct	ON
Tufted Puffin, *Fratercula cirrhata*	Jul–Oct	O

[a]If the season is other than July–October, 95–99% of birds occurred during the season given. Cassin's Auklets in October were assumed to be predominantly migrants and their numbers were not used in calculations.

[b]From July to October, >99% of birds classed as offshore (O) occurred at depths >20 m, except the Tufted Puffin at 92%. For species classed as nearshore (N), 97–99% occurred at depths <20 m.

[c]Species readily attracted to fishing vessels.

absent in other months. We identified each species' habitat as nearshore (at water depths <20 m), offshore (at depths >20 m), or both (Table 2).

We included data from counts at fishing vessels and chum stops. Our study area is within a region with consistent local fishing effort. We could not be certain whether vessels out of radar or visual range affected numbers of birds seen away from vessels, and there were obvious variations in the degree of attraction to a given vessel, possibly due to factors like numbers of vessels working locally or within a larger area, or how long a given vessel had been working. Our routine was consistent: we visited vessels attracting birds when possible, and we chummed birds at a similar location on each trip. Over the study there was no significant difference in vessels visited per kilometer.

Transect length was rounded to the nearest 0.5 km. "Abundance" (number of birds per kilometer) was calculated by dividing total numbers by total kilometers traveled within season and habitat. We used linear regression analysis to determine long-term trends and *t* tests to compare time periods.

We designated climatic periods or events on the basis of oceanographic descriptions (e.g., Ebbesmeyer et al. 1991, Springer 1998), upwelling indices (National Marine Fisheries Service), and periods positive or negative with respect to the Pacific Decadal Oscillation (PDO) (N. J. Mantua et al. unpubl. data). Ebbesmeyer et al. (1991) showed abrupt shifts in 40 multidisciplinary environmental variables in 1976. We used this "step" (or "regime shift") to assist in defining time periods. These periods are pre-step, 1972–76, post-step 1977–82; El Niño of 1982–83 (numbers of several abundant species indicate a delayed response to this event, and we use 1983–84 data to describe its effects), post-El Niño, 1985–89, and 1990–98, a warm period of generally low ocean productivity. The PDO has been positive since 1976 (Mantua et al. 1996). Of the minor Los Niños of 1973, 1976, and 1986, and Los Niños or noticeable food-web changes of 1978, 1989, and 1990 noted by Ainley et al. (1995a), we believe only the 1989–90 food-web change was noticeable in our data. Some anecdotal reports supplement discussions below.

RESULTS AND DISCUSSION

Two of the 24 species are postbreeding visitors from southern California and Mexico, eight breed in the Pacific Northwest, six are visitors from the southern hemisphere or the western central Pacific Ocean, and eight are Alaska–arctic breeders. Six of the Alaska–arctic breeders—phalaropes, jaegers, Sabine's Gull, and Arctic Tern—are migrants whose occurrence is quite variable. We believe that our sampling effort was likely inadequate to detect changes in populations of these species, which may migrate in "waves," complicating determination of annual variability. Especially during years of high abundance, variation was greater for these "migrants" than for other species.

Black-footed Albatross. Abundance increased significantly from 1972 to 1998 (Figure 2; Table 3). Albatrosses increased following the 1976 step and dramatically in the 1990s (Table 4). Large numbers of albatrosses and fulmars were often associated with fishing vessels.

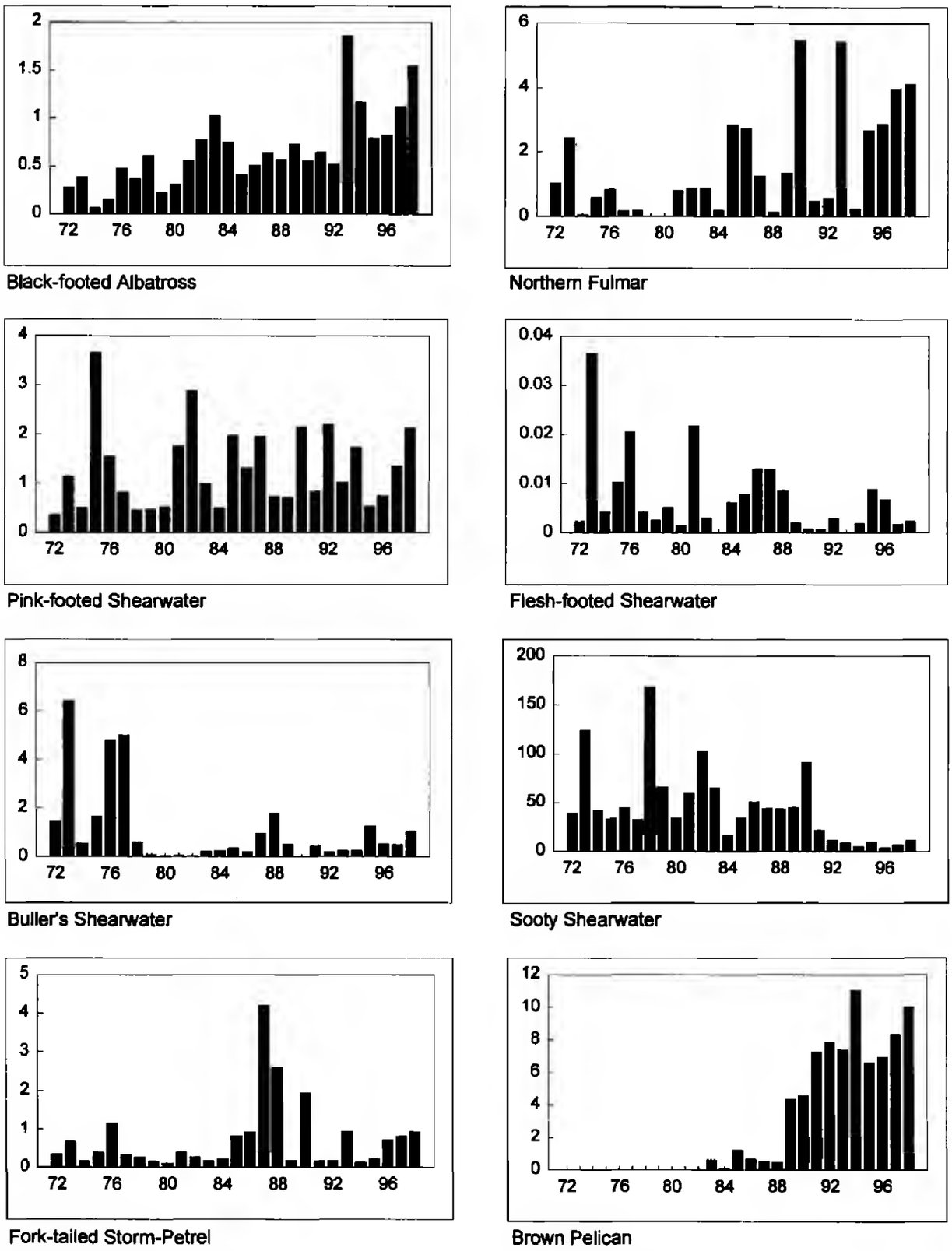
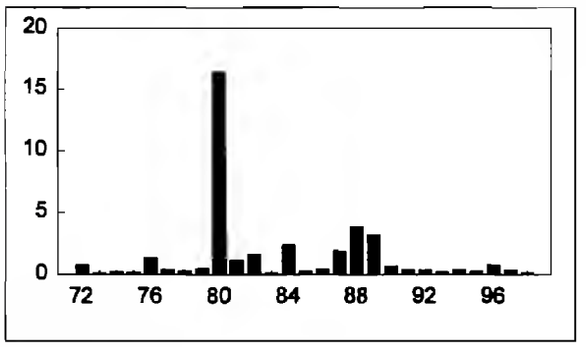


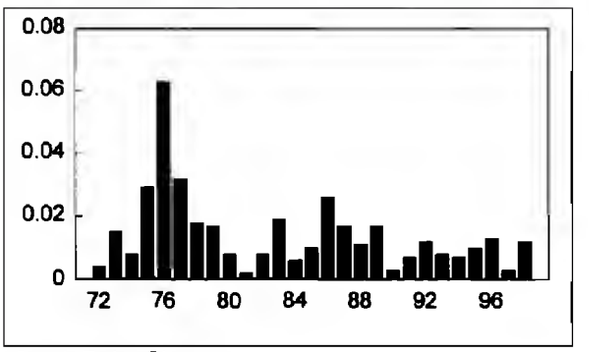
Figure 2. Number of birds per kilometer within habitat and season (see Table 2) by year.

Northern Fulmar. Though numbers of nonbreeding birds in the study area varied from year to year, they increased significantly over the entire study (Figure 2; Table 3) and in the 1990s (Table 4).

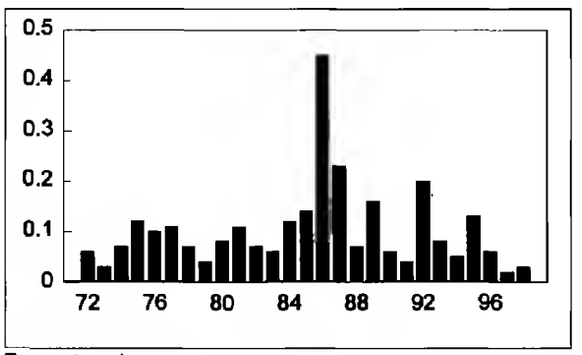
Pink-footed Shearwater. Abundance varied greatly by year (Figure 2), and no change was apparent. Though birds tended to concentrate at fishing



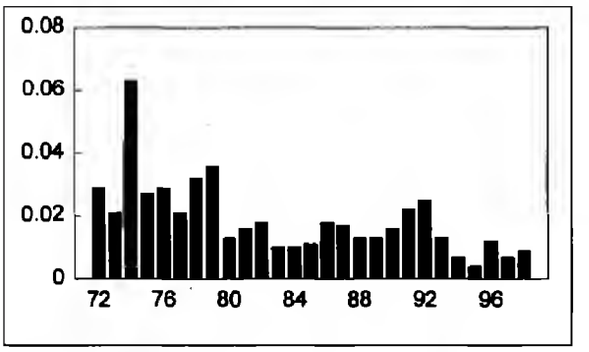
Phalaropes



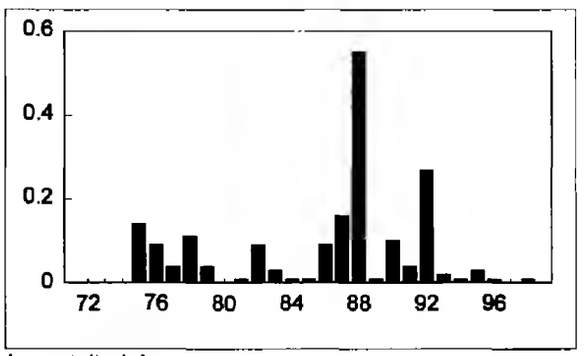
South Polar Skua



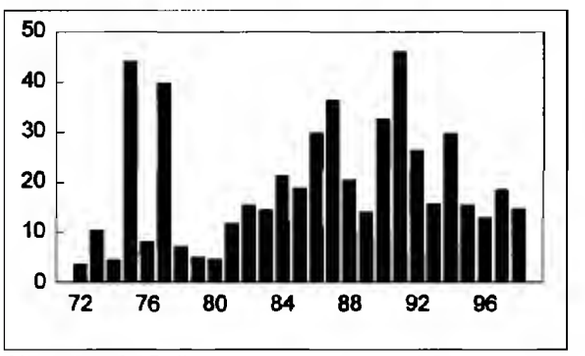
Pomarine Jaeger



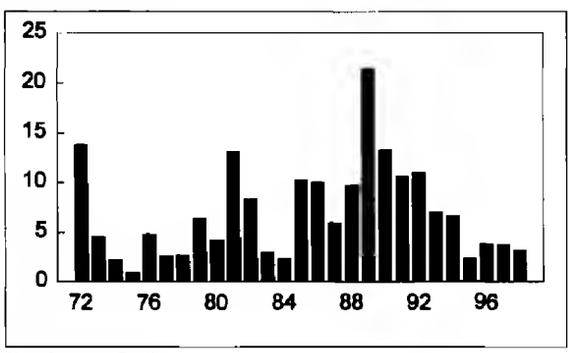
Parasitic Jaeger



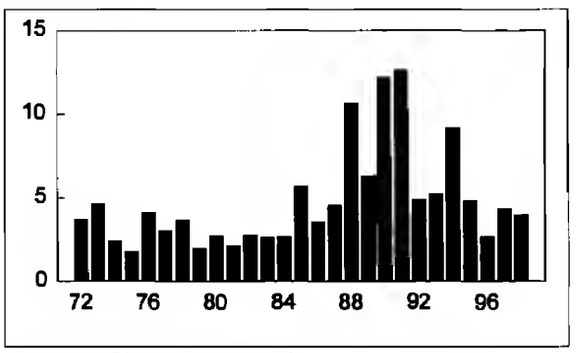
Long-tailed Jaeger



Heermann's Gull



California Gull

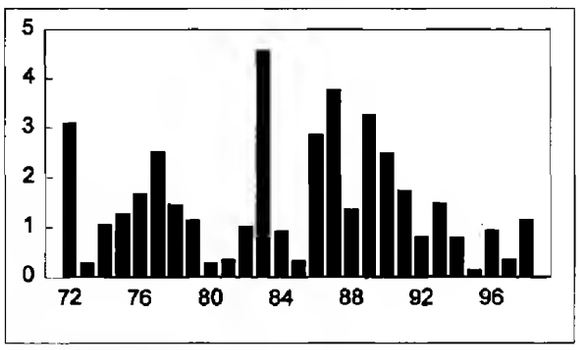


Western/Glaucous-winged gulls

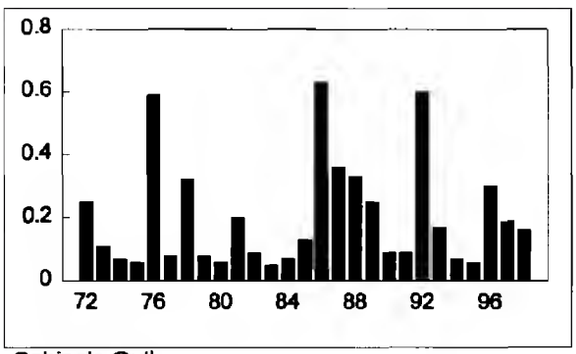
vessels, calculations using numbers of birds encountered away from vessels showed an increase in the 1990s ($P = 0.05$)

Flesh-footed Shearwater. Though this species was never common, numbers declined following the 1976 step change (Table 4). Ninety-six of 150 birds were noted at fishing vessels.

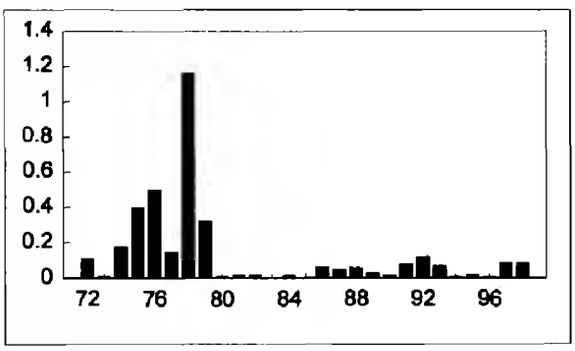
Buller's Shearwater. Numbers increased in the 1970s following near absence along the west coast of North America (see Jenkins 1974, Wahl



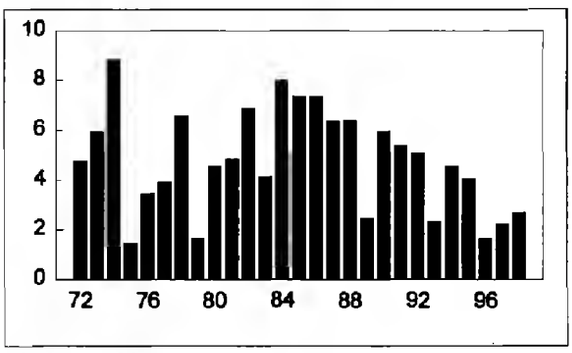
Black-legged Kittiwake



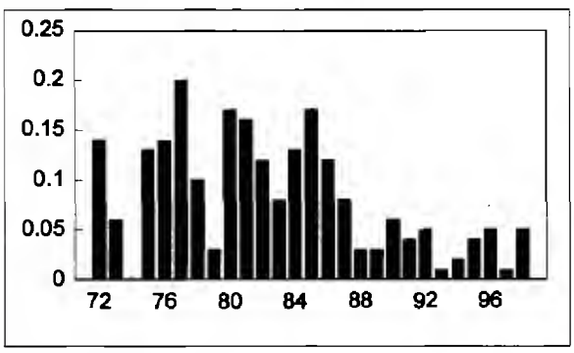
Sabine's Gull



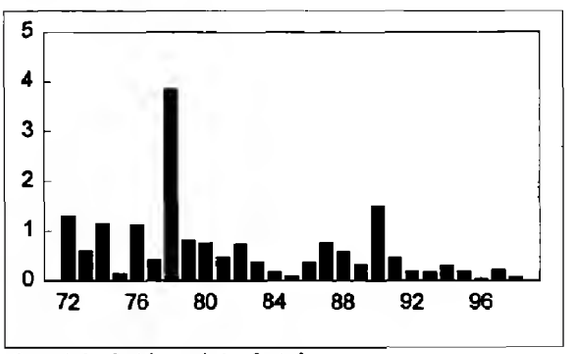
Arctic Tern



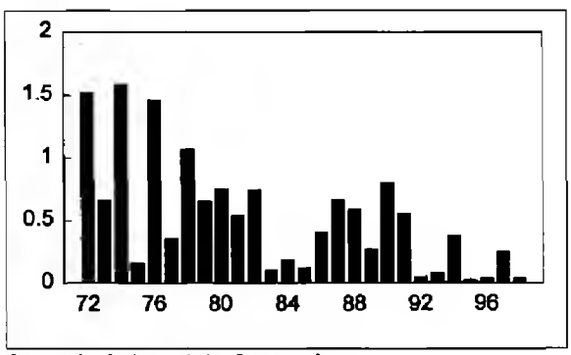
Common Murre



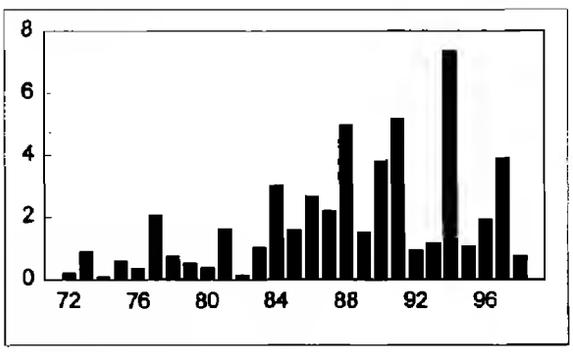
Marbled Murrelet



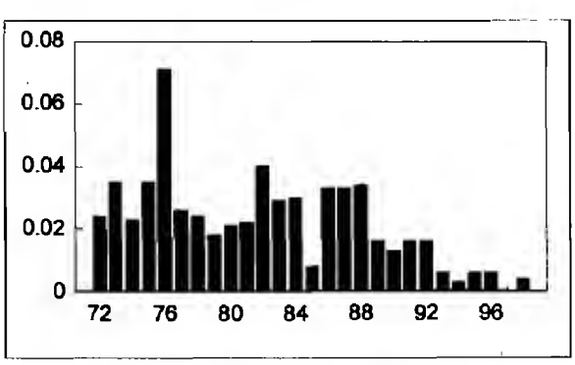
Cassin's Auklet - July-October



Cassin's Aulet - July-September



Rhinoceros Auklet



Tufted Puffin

Table 3 Results of Linear Regression Showing Changes in Abundance, 1972–1998

Species	Change	*P*
Black-footed Albatross	+	0.01
Northern Fulmar	+	0.01
Flesh-footed Shearwater	–	0.05
Buller's Shearwater	–	0.05
Sooty Shearwater	–	0.01
Brown Pelican	+	0.01
South Polar Skua	–	0.05
Parasitic Jaeger	–	0.01
Western/Glaucous-winged Gull	+	0.05
Arctic Tern	–	0.05
Marbled Murrelet	–	0.01
Cassin's Auklet (Jul–Sep)	–	0.01
Cassin's Auklet	–	0.05
Rhinoceros Auklet	+	0.01
Tufted Puffin	–	0.01

1985) but decreased after 1977 (Figure 2, Table 4), did not recover after that, and showed a long-term decrease (Table 3). This species does not forage at vessels (Wahl and Heinemann 1979), and its numbers appear to have been dependent on "natural" food sources.

Sooty Shearwater. The decline of this, the seasonally most abundant species along the west coast of North America, was obvious and drastic (Figure 2; see Veit et al. 1997). Numbers decreased over time (Table 3), more noticeably in the 1990s (Table 4). Though the Sooty Shearwater is attracted to fishing vessels, particularly shrimp trawlers, this attraction is less than for some other species (Wahl and Heinemann 1979). Very large proportions (1972–1998 average 67%) of all Sooty Shearwaters foraged in nearshore waters and the Grays Harbor channel. Though other species maintained their numbers or even increased in nearshore waters over time, Sooty Shearwater numbers decreased greatly there as they did in all habitats.

Fork-tailed Storm-Petrel. We did not see abundance changes over the long term.

Brown Pelican. Following years of near absence in Washington, nearshore-foraging pelicans reoccupied a historical nonbreeding range (Figure 2; see Jewett et al. 1953, Jacques et al. 1992), likely because of increasing reproductive success following an era of failure (Anderson and Anderson 1992). There was a significant long-term increase (Figure 2; Table 3). Highest abundances were in the 1990s (Figure 2; Table 4). In 1983 and the 1990s, periods of notably warm water, there was a noticeable increase in the proportion of juveniles (Wahl unpubl.). In the 1990s there was also an increase in sightings of pelicans offshore, with an occasional bird occurring to the outer limits of our surveys.

Phalaropes. Like other migrants, phalaropes varied greatly by year, and varied day to day by as much as an order of magnitude or more. Our

Table 4 Results of *t*-Test Comparisons of Seabird Numbers at Two Oceanographic Shifts

	1977–1998 vs. 1972–1998[a]		1990–1998 vs. 1972–1989	
Species	Change	*P*	Change	*P*
Black-footed Albatross	+	0.05	+	0.01
Northern Fulmar			+	0.01
Flesh-footed Shearwater	–	0.05		
Buller's Shearwater	–	0.01		
Sooty Shearwater			–	0.05
Brown Pelican			+	0.01
South Polar Skua			–	0.05
Parasitic Jaeger	–	0.01	–	0.05
Western/Glaucous-winged Gull			+	0.05
Common Murre (Sep–Oct)			–	0.05
Marbled Murrelet			–	0.01
Cassin's Auklet (Jul–Sep)	–	0.01	–	0.05
Rhinoceros Auklet	+	0.05	+	0.05
Tufted Puffin	–	0.05	–	0.01

[a]Comparison of post-step/PDO-positive period with pre-step/PDO-negative period.

sampling effort probably was inadequate to reveal significant changes over time. Red-necked Phalaropes (*Phalaropus lobatus*) migrate essentially over the continental shelf in the region (Wahl et al. 1989), but it is possible that Red Phalaropes (*P. fulicaria*) migrated farther offshore, west of the study area, in some years.

South Polar Skua. Abundance was highest from 1975 to 1977, after which a significant long-term decrease ensued (Table 3). In the 1990s decreases over previous periods were evident (Table 4).

Pomarine Jaeger. Though there were obvious peaks in occurrence (particularly in 1986; Figure 2), no trend was noticeable. The species migrates over the breadth of the subarctic North Pacific (Wahl et al. 1989), so changes in abundance may not be evident over the continental shelf. Jaegers are attracted to other birds at vessels and chum stops but were often noted migrating away from attractions. In peak years, migration in "waves" of up to 200 per day was noticeable.

Parasitic Jaeger. Migrating inshore more frequently than the other jaegers, the Parasitic appeared to decline (Table 3).

Long-tailed Jaeger. Like the Pomarine Jaeger, this species is a predominantly oceanic migrant, and changes in abundance may not be evident over the continental shelf. August–September occurrence was variable: large numbers were noted during particularly in 1988 and 1992 (Figure 2).

Heermann's Gull. Foraging almost strictly in nearshore waters and inside Grays Harbor, Heermann's Gulls appeared to increase over time (Figure 2), though this increase was not statistically significant. As with the Brown Pelican, in the warm-water periods of 1983 and the 1990s the proportion of juveniles increased noticeably (Wahl unpubl.).

California Gull. This species' population has increased greatly rangewide, by about 500% from the 1920s to 1980 (Conover 1983). The largest Washington colonies were established in the early 1970s (Conover et al. 1979). Perhaps not coincidentally, large numbers were attracted to industrial fishing fleets off Washington in the 1960s and 1970s (Wahl 1975). During the years of this study, no statistical trend is apparent. Though foreign fleets ceased operating off Washington in the late 1970s, Morgan et al. (1991) reported flocks of thousands of California Gulls at fleets off British Columbia just north of our study area during censuses starting in 1981. Abundances of California Gulls increased with distance from shore, where birds were associated with fishing vessels (see Wahl and Heinemann 1979).

Western/Glaucous-winged gulls. Because of extensive intergradation between the two resident breeding gulls (Hoffman et al. 1978, Bell 1996), their numbers were often lumped during surveys, and we combine them here. There was a significant increase from 1972 to 1998 (Table 3) and an increase in the 1990s over previous periods (Table 4).

Black-legged Kittiwake. Great variability in kittiwake numbers probably reflected changes in breeding status to the north of the study area (see Hatch et al. 1993). From July to October kittiwakes, largely nonbreeders, foraged almost exclusively in Grays Harbor or the outflow area and very seldom in their regular winter habitat offshore. There was no long-term trend in numbers spending the summer in the study area. Nonbreeding kittiwakes foraged in very large numbers at Grays Harbor in 1983 (Figure 2). Nesting productivity that year at the nearest colonies, in the Gulf of Alaska, was extremely low (Hatch et al. 1993).

Sabine's Gull. Apparently concentrating over the continental shelf when migrating off Washington (see Wahl et al. 1989), Sabine's Gull varied irregularly in abundance. Interestingly, because Sabine's Gulls are pursued by kleptoparasitic jaegers, 1986, 1988, and 1992 (Figure 2) were also peak years for the Pomarine or Long-tailed jaegers.

Arctic Tern. Arctic Terns declined (Figure 2; Table 3). They migrate ocean-wide (Wahl et al. 1989), and it is possible that some shifted to routes farther offshore following the step change and decline in ocean productivity in the mid-1970s.

Common Murre. Murre reproduction along the U.S. west coast declined starting in the early 1980s (e.g., Bayer 1986, Wilson 1991). Relatively few murres breed in Washington (Speich and Wahl 1989), and Wilson (1991) reported significantly depressed nesting success there in 1982 and 1983. Almost all murres in our study area July–October are from colonies south of Washington and move north for the winter. The major colonies in Oregon suffered low breeding success in the 1990s, especially in 1993 and 1996 (Lowe 1993, 1996), and in 1996 an Oregon survey of beached birds yielded the highest numbers of dead, emaciated murres of breeding age in 19 years (Lowe 1996). High rates of mortality and low productivity were also evident in 1997 (R. Lowe pers. comm.). Populations have also been stricken by oil spills (Speich and Thompson 1987, Ford et al. 1991, Divoky 1992) and in the 1990s by noticeably high gill-net mortality (Burger 1993, Kaiser 1993). Timing of movements probably depends on breeding success, which is dependent on ocean productivity. In 1984 our numbers were above average

(Figure 2). We believe numbers seen then and in the 1990s included large numbers of failed breeders (see Ainley et al. 1995b) and that our results understate the decline in overall numbers. The proportion of murres in nearshore waters (<20 m depth) increased over time ($P = 0.01$), from 40% in 1972–76 to 93% in the 1990s. Low sampling effort in nearshore murre habitat in 1978 complicates determination of abundance and may have resulted in our finding of nonsignificant long-term change.

Marbled Murrelet. As elsewhere, Marbled Murrelets declined significantly from 1972 to 1998 (Figure 2, Table 3; see Varoujean and Williams 1995) and in the 1990s compared to previous years (Table 4). This species' well-documented problems with loss of breeding habitat (Ralph et al. 1995), however, may obscure the effects of oceanographic events.

Cassin's Auklet. Numbers of Cassin's Auklets from July to October—some almost certainly migrants from large populations in British Columbia and Alaska—showed a decrease (Table 3). Numbers from July to September, presumably representing local breeders, decreased sharply following El Niño of 1982–1983 (Figure 2) and more generally over the entire study (Table 3). The species suffered not only low productivity at Oregon colonies (Lowe 1993) but also sizable mortality in an oil spill in 1988 and 1989 (Ford et al. 1991). Numbers from July to September 1977–1982 (Figure 2) decreased following the regime shift (Table 4).

Rhinoceros Auklet. Numbers increased significantly (Table 3) from 1972 to 1998, with highest values in the 1990s (Fig. 2). The increase reflects in part breeding success in the Protection Island colony on the Strait of Juan de Fuca (Speich and Wahl 1989), which fared better than the coastal colonies until the early 1990s (Wilson, in Smith et al. 1997), along with increased use of nearshore coastal waters ($P = 0.05$; from 82% 1972–76 to 98% in the 1990s).

Tufted Puffin. In correspondence with their poor nesting success (e.g., Lowe 1993), puffins decreased dramatically over time (Figure 2; Table 3), both following the step in 1976 and further in the 1990s (Table 4).

Other Species

We do not include analyses of data for two offshore species. Leach's Storm-Petrel (*Oceanodroma leucorhoa*) forages primarily west of our study area, and our sample size—just 31 records—for Xantus' Murrelet (*Synthliboramphus hypoleucus*) is inadequate. Our data are inadequate to address the status of nearshore foragers like cormorants (*Phalacrocorax* spp.), the Caspian Tern (*Sterna caspia*), and Pigeon Guillemot (*Cepphus columba*) or regular winter visitors and late migrants like the Short-tailed Shearwater (*P. tenuirostris*), Bonaparte's, Herring, Thayer's and Glaucous gulls (*L. philadelphia*, *argentatus*, *thayeri*, and *hyperboreus*, respectively), Ancient Murrelet (*Synthliboramphus antiquus*), and other alcids. It should be noted that the wintering status of the Northern Fulmar and Black-legged Kittiwake may differ considerably from these species' July–October status, which reflects the abundance and distribution of nonbreeders.

Changes in Abundances, 1972–1998

Of the five species that increased (Table 3), the Black-footed Albatross, Northern Fulmar, and Western/Glaucous-winged Gulls scavenge readily at

fishing vessels, and the Brown Pelican and Rhinoceros Auklet forage primarily in nearshore waters. The latter were the only two species not foraging at fishing vessels that increased over time. The pelican's increase represents a population recovery and range reoccupation in the 1980s. The Rhinoceros Auklet may reflect a population and range expansion (Sowls et al. 1980), perhaps facilitated by the species' switching habitats and, along with pelicans, taking advantage of large anchovy (*Engraulis mordax*) schools inshore (pers. obs.).

Ten species (Table 3) decreased significantly. The decreases in three (and almost certainly four) breeding alcids and the huge decrease in the Sooty Shearwater (Figure 2; see Veit et al. 1997) appear to reflect a prolonged decline in ocean productivity.

Though large variations are apparent, nine species did not show statistically significant changes. Our data do not show changes in numbers of several Alaska–arctic migrants (phalaropes, at least two of the jaegers, and Sabine's Gull). The Black-legged Kittiwake's pattern presumably reflects variations in the distribution of nonbreeding birds. The Fork-tailed Storm-Petrel's variations may be due to localized feeding conditions and the distribution of nonbreeders and failed breeders.

Differences between Oceanographic Periods, "Regimes," or "Events"

In spite of obvious annual variations (Figure 2), comparisons by *t* test for each of the periods with those of the preceding period showed very few statistically significant changes. One "significance" of such comparisons may be in the difficulties in seeing changes over relatively short periods. Notations of periods of high and low numbers per kilometer nevertheless show overall differences between periods or events (Table 5).

Pre-regime shift/PDO-negative period: 1972–1976. There were high numbers of six offshore foragers (the three shearwaters, skua, Cassin's Auklet, and Tufted Puffin) and lowest numbers of three other species that later steadily increased over time. Though the sample size was relatively low (Table 1), additional data from a two-week research cruise off Grays Harbor in 1976 (Wahl unpubl.) gave a picture very similar to that gained from chartered vessels in that year.

Post-step/PDO-positive period: 1977–1982. Few species were at highest or lowest numbers, but changes were implicit in that numbers of many species declined obviously following the step. Sooty Shearwaters were at their greatest abundance.

El Niño 1983–1984. Ten species, seven of these offshore foragers, were at lowest numbers. High numbers of kittiwakes and murres probably reflected presence of nonbreeders and failed breeders, respectively. Additionally, along the coast Elegant Terns (*Sterna elegans*) (Hunn and Mattocks 1984) and offshore Wilson's Storm-Petrel (*Oceanites oceanicus*) (Harrington-Tweit and Mattocks 1984) were recorded for the first time in Washington.

1985–1989. Six species increased to highest levels following El Niño. These included the Long-tailed Jaeger and Sabine's Gull offshore, where peaks in numbers of Fork-tailed Storm-Petrels (Figure 2) were noteworthy. The effects of the 1988–1989 La Niña, which would presumably have been

Table 5 Periods of Highest (H) and Lowest (L) Numbers of Birds per Kilometer by Species

Species	1972–76 Pre-step	1977–82 Post-step	1983–84 El Niño	1985-89 post-El Niño	1990–98 1990s
Offshore					
Black-footed Albatross[a]	L				H
Northern Fulmar[a]		L			H
Pink-footed Shearwater[a]	H		L		
Flesh-footed Shearwater[a]	H				L
Buller's Shearwater	H		L		
Fork-tailed Storm-Petrel			L	H	
South Polar Skua	H				L
Long-tailed Jaeger			L	H	
Sabine's Gull			L	H	
Arctic Tern		H	L		
Cassin's Auklet	H		L		
Tufted Puffin	H				L
Offshore–nearshore					
Sooty Shearwater[a]		H			L
Phalaropes		H			L
Pomarine Jaeger				H	L
Parasitic Jaeger	H		L		
California Gull[a]			L	H	
Western/ Glaucous-winged Gull[a]		L		H	
Common Murre			H		L
Rhinoceros Auklet	L				H
Nearshore					
Brown Pelican	L				H
Heermann's Gull		L		H	
Black-legged Kittiwake			H		L
Marbled Murrelet		H			L

[a]Species readily attracted to fishing vessels.

reflected in increased ocean productivity in 1989, are not apparent in our findings.

The 1990s. Upwelling varied by region along the west coast of North America but was generally below long-term averages (National Marine Fisheries Service). Patterns of seabird abundance off Washington were in accord with this and a similar situation off California (Ainley et al. 1995b, Veit et al. 1997). Within the period strong El Niño conditions were noted in 1992–1993 and 1998. Overall, this period appeared to be the opposite of the pre-step period. The only offshore species found in high numbers were the fishing vessel-associates: albatrosses and fulmars. The offshore–nearshore foraging Western/Glaucous-winged gull and two nearshore foragers, the pelican and Rhinoceros Auklet, also reached highest numbers. Seven species were at lowest numbers of any of the five periods. The decline of the Sooty Shearwater was particularly evident. The average for 1990–

1998 was 75% lower than at the peak, 1977–1982. Similarly, numbers of four regional breeders, the Common Murre, Marbled Murrelet, Cassin's Auklet, and Tufted Puffin, were very low in the 1990s (Figure 2). Though numbers of other species apparently rebounded quickly following the 1983-1984 event, numbers of these remained low in the 1990s in spite of reported changes like La Niña events. Phalarope numbers were also conspicuously low. The duration of the shift in the 1990s appears particularly important.

Manx Shearwaters (*Puffinus puffinus*) (Tweit and Paulson 1994) and Elegant Terns (unrecorded since 1983; Tweit and Fix 1991) occurred several times. Laysan Albatrosses (*Phoebastria immutabilis*) increased dramatically in the mid-ocean northeast Pacific (K. Morgan pers. comm.) and along the west coast of North America (e.g., 30 off Washington in December 1995; Rogers 1996) and included Washington's first summer records. This species' increase was possibly in related in part to the expansion of its breeding range to islands off Mexico (Gallo-Reynoso and Figueroa-Carranza 1996).

Considerations and Questions

Changes in Habitats. Along with gulls, three historically abundant species forage widely over the continental shelf and can shift to available inshore prey when oceanic prey declines (see Burger 1993, Ainley et al. 1996). From 1972 to 1998 Common Murres and Rhinoceros Auklets increased near shore ($P = 0.01$ and $P = 0.05$, respectively), but Sooty Shearwaters declined there, as they did overall.

Near shore, Brown Pelicans reoccupied a historical nonbreeding range (Figure 2 and see Jewett et al. 1953). Rhinoceros Auklets increased, shifting to nearshore waters in the 1990s. Another nearshore forager, the Caspian Tern, expanded its breeding range into southwest Washington in 1957 (Penland 1982), and its colonies increased to thousands of breeding birds (see Bird 1994, Lowe 1996). As over much of North America, Double-crested Cormorants (*Phalacrocorax auritus*) increased over the period (e.g., Vermeer and Rankin 1984). These four species are primarily nearshore or estuarine foragers and may reflect associations with concentrations of anchovies. The situation may change in the future as sardines (*Sardinops sagax*) and anchovies alternate cyclically in abundance, and stocks of sardines along the northwest coast have been increasing greatly since 1983 (Bargmann 1997). Offshore, there were no replacements in seabird species or numbers.

Another switch is to inland marine waters of the Strait of Juan de Fuca and adjacent areas. Several offshore species occur sporadically in inland waters, and recent reports from this area suggest increased frequency and numbers of the Fork-tailed Storm-Petrel, jaegers, phalaropes, and Brown Pelicans (e.g., Tweit and Gilligan 1998).

Changes in migrations. Changes in abundance of the Red Phalarope, Pomarine and Long-tailed jaegers, and Arctic Tern over the continental shelf may not represent changes in populations but rather changes in foraging areas or migration paths in response to food availability. Summer-resident storm-petrels and phalaropes forage over oceanic waters farther offshore

than the continental shelf and may shift foraging areas. Though this may also be the case for migrating phalaropes, the decline in the 1990s of one historically abundant planktivore, Cassin's Auklet (Figure 2; Speich and Wahl 1989), which forages primarily over the outer shelf and continental slope (see Briggs et al. 1992), was likely not due to a shift farther offshore than the study area. There was sizable mortality of beached birds in Oregon (see Lowe 1993) and large declines in breeding birds in huge colonies in British Columbia (Vermeer et al. 1997).

Effects on regional populations. Local productivity relates to prey species and regional breeding success (see Denman et al. 1989 and Thomson et al. 1989). For species covered by both our data and Ainley et al. (1994), our analyses agree with trends of species breeding in the northern California Current: declines in most species except for the Rhinoceros Auklet and large gulls. The increase in our Rhinoceros Auklet abundance follows the recent trend of populations along the west coast of North America described by Ainley et al. (1994).

Effects of conditions elsewhere. Veit et al. (1997) pointed out the importance of pre-migration feeding in the California Current to south-bound Sooty Shearwaters. More recently, Spear and Ainley (1999) proposed that Sooty Shearwaters switched migration routes and foraging areas to the west and that the total population did not decrease when productivity off the west coast declined. Resolution of this question may be impossible without counts of the breeding population.

Effects of commercial fishing. Ainley et al. (1994) drew attention to the relationship of food availability with reproductive success and pointed out patterns off California similar to those seen in Peru, where intense fishing coinciding with climatic stress "wrecked" seabirds' main food supply. Ainley et al. (1994, 1996) also raised the subject of competition by human fishing with seabirds for prey species. We cannot address these issues here, but commercial fishing is a major, perhaps dominating, aspect of our study area's ecosystem.

Over the long term, three of seven species strongly attracted to vessels—albatrosses, fulmars, and Western/Glaucous-winged gulls—increased over time (Table 3), all with highest abundances in the 1990s. California Gulls probably increased. Of ship-following species only the Sooty Shearwater decreased.

We lack data on fishing effort, efficiency (catch), discards (bycatch), and regional distribution of vessels off British Columbia, Washington, and Oregon. Until 1976, for example, Russian fishing trawlers and processors regularly operated off Grays Harbor. Subsequent efforts by other foreign and domestic ventures have varied in effort and location. Though numbers of some birds may have been maintained by forage available at vessels, the effects of shifts in fishing effort on seabird distribution are unknown.

CONCLUSION

Additional years of sampling may show whether trends we have seen were part of a long-term shift (i.e., climate change) or were previously unquantified cyclical variations that will change over time. Many questions arise regarding

shifts in migration routes, replacement of one species by another, the effects of and importance of type, effort, and changes in commercial fishing practices, and the effects of conditions off Washington on regional and southern hemisphere breeders. Additional studies of oceanography and prey species may shed light on annual variations not apparently related to large-scale events and on further questions implicit in our findings.

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LITERATURE CITED

Ainley, D. G. 1976. The occurrence of seabirds in the coastal region of California. W. Birds 7:33–68.

Ainley, D. G., Sydeman, W. J., Hatch, S. A., and Wilson, U. W. 1994. Seabird population trends along the west coast of North America: Causes and the extent of regional concordance, in A century of avifaunal change in western North America (J. R. Jehl, Jr. and N. K. Johnson, eds.). Studies Avian Biol. 15:119–133.

Ainley, D. G., Sydeman, W. J., and Norton, J. 1995a. Upper trophic level predators indicate significant interannual positive and negative anomalies in the California Current food web. Mar. Ecol. Prog. Ser. 118:69–79.

Ainley, D. G., Veit, R. L., Allen, S. G., Spear, L. B., and Pyle, P. 1995b. Variations in marine bird communities of the California current, 1986–1994. Calif. Coop. Fish. Invest. Rep. 36:72–77.

Ainley, D. G., Spear, L. B., Allen, S. G., and Ribic, C. A. 1996. Temporal and spatial patterns in the diet of the Common Murre in California waters. Condor 98:691–705.

Anderson, D. W., and Anderson, I. T. 1976. Distribution and status of Brown Pelicans in the California Current. Am. Birds 30:3–12.

Bargmann, G. 1997. The re-emergence of sardines along the coast of Washington in 1997. Summary of management and ecological issues. Fish Mgmt. Prog., Wash. Dept. Fish & Wildlife, 600 Capitol Way N., Olympia, WA 98501.

Bayer, R.D. 1986. Breeding success of seabirds along the mid-Oregon coast concurrent with the 1983 El Niño. Murrelet 67:23–26.

Bell, D. A. 1996. Genetic differentiation, geographic variation and hybridization of gulls of the *Larus glaucenscens–occidentalis* complex. Condor 98:527–646.

Bird, F. 1994. The colorful history and provocative future of Everett's terns. Wash. Ornithol. Soc. News 32:2–5.

Briggs, K. T., Tyler, W. B., Lewis, D. B., and Carlson, D. R. 1987. Bird communities at sea off California: 1975–1983. Studies Avian Biol. 11.

Briggs, K. T., Varoujean, D. H., Williams, W. W., Ford, R. G., Bonnell, M. L., and Casey, J. L. 1992. Seabirds of the Oregon and Washington OCS, 1989–1990, in Oregon and Washington marine mammal and seabird surveys, final report (J. J. Brueggeman, ed.). Pacific OCS Region, MMS. OCS study MMS 91-0093. U.S. Dept. Interior, Minerals Mgmt. Service, Pacific OCS Office, 1340 W. Sixth St., Los Angeles, CA 90017.

Burger, A. E. 1993. Possible El Niño effect detected in beached bird survey data in 1992. Br. Columbia Field Ornithol. 3:10–11.

Conover, M. R., Thompson, B. C., Fitzner, R. E., and Miller, D. E. 1979. Increasing populations of Ring-billed and California gulls in Washington state. W. Birds 10:31–36.

Conover, M. R. 1983. Recent changes in Ring-billed and California gull populations in the western United States. Wilson Bull. 95:362–383.

Denman, K. L., Freeland, H. J., and Mackas, D. L. 1989. Comparisons of time scales for biomass transfer up the marine food web and coastal transport processes, in Effects of ocean variability on recruitment and an evaluation of parameters used in stock assessment models (R. J. Beamish and G. A. McFarlane, eds.). Can. Spec. Publ. Fish. Aquat. Sci. 108:255–264.

Divoky, G. 1992. Regional reports: Washington/British Columbia. Pac. Seabird Group Bull. 19:17.

Ebbesmeyer, C. C., Cayan, D. R., McLain, D. R., Nichols, F. H., Peterson, D. H., and Redmond, K. T. 1991. 1976 step in the Pacific climate: Forty environmental changes between 1968–1975 and 1977–1984, in Proceedings of the Seventh Annual Pacific Climate (PACLIM) Workshop, April 1990 (J. L. Betancourt and V. L. Tharp, eds.), pp. 129-141. Calif. Dept. Water Resources Interagency Ecol. Studies Program Tech. Rep. 26.

Favorite, F., Dodimead, A. J., and Nasu, K. 1976. Oceanography of the subarctic Pacific region, 1960–71. Int. N. Pac. Fish. Comm. Bull. 33.

Ford, R. G., Varoujean, D. H., Warrick, D. R., Williams, W. A., Lewis, D. B., Hewitt, C. L., and Casey, J. L. 1991. Final report: Seabird mortality resulting from the *Nestucca* oil accident, winter 1988–89. Wash. Dept. Wildlife, 600 Capitol Way N., Olympia, WA 98501.

Gallo-Reynoso, J.-P., and Figueroa-Carranza, A.-L. 1996. The breeding colony of Laysan Albatrosses on Isla de Guadalupe, Mexico. W. Birds 27:70–76.

Garthe, S., and Hüppop, O. 1999. Effect of ship speed on seabird counts in areas supporting commercial fisheries. J. Field Ornithol. 70:28–32.

Harrington-Tweit, B., and Mattocks, P. W., Jr. 1984. The nesting season. Northern Pacific Coast region. Am. Birds 38:1054.

Hatch, S. A., Byrd, G. V., Irons, D. B., and Hunt, G. L., Jr. 1993. Status and ecology of kittiwakes (*Rissa tridactyla* and *R. brevirostris*) in the North Pacific, in The status, ecology and conservation of marine birds of the North Pacific (K. Vermeer, K. T. Briggs, K. H. Morgan, and D. Siegel-Causey, eds.), pp. 140–153. Can. Wildlife Serv., Ottawa.

Hoffman, W., Wiens, J. A., and Scott, J. M. 1978. Hybridization between gulls (*Larus glaucescens* and *L. occidentalis*) in the Pacific Northwest. Auk 95:441–458.

Hunn, E. S., and Mattocks, P. W., Jr. 1984. Northern Pacific Coast region. Am. Birds 38:236–240.

Jacques, D. L., Anderson, D. W., and Lowe, R. W. 1992. Abstract: Northward range expansion in California Brown Pelicans. Pac. Seabird Group Bull. 19:50.

Jenkins, J. A. F. 1974. Local distribution and feeding habits of Buller's Shearwater (*Puffinus bulleri*). Notornis 21:109–120.

Jewett, S. A., Taylor, W. P., Shaw, W. T., and Aldrich, J. W. 1953. Birds of Washington State. Univ. Wash. Press, Seattle.

Kaiser, G. W. 1993. Seabird wreck in Boundary Bay. Pac. Seabird Group Bull. 20:18–19.

Lowe, R. 1993. El Niño hard on Oregon seabirds. Pac. Seabird Group Bull. 20:62.

Lowe, R. 1996. Regional reports, Washington and Oregon. Pac. Seabirds 23:21.

Mantua, N. J., Hare, S. R., Zhang, Y., Wallace, J. M., and Francis, R. C. 1996. A Pacific interdecadal climate oscillation with impacts on salmon production. JISAO contr. 379. JISAO, Univ. of Wash., Box 354235, Seattle, WA 98195.

Morgan, K. H., Vermeer, K., and McKelvey, R. W. 1991. Atlas of pelagic birds of western Canada. Can. Wildlife Serv. Occas. Paper 72.

Penland, S. 1982. Distribution and status of the Caspian Tern in Washington State. Murrelet 63:73–79.

Ralph, C. J., Hunt, G.L., Jr., Martin, M. G., and Piatt, J. F., eds. 1995. Ecology and conservation of the Marbled Murrelet. Gen. Tech. Rep. PSW-GTR-152. U. S. Forest Service Pacific Southwest Research Station, Albany, CA.

Rogers, R. (comp.). 1996. Washington field notes. Wash. Soc. Ornithol. News 43:9.

Sanger, G. A. 1965. Observations of wildlife off the coast of Washington and Oregon in 1963, with notes on the Laysan Albatross (*Diomedea immutabilis*) in the area. Murrelet 46:1–6.

Sanger, G. A. 1970. The seasonal distribution of some seabirds off Washington and Oregon; with notes on their ecology and behavior. Condor 72:339–357.

Sanger, G. A. 1972. Checklist of bird observations from the eastern North Pacific Ocean. Murrelet 53:16–21.

Smith, M. R., Mattocks, P. W., Jr., and Cassidy, K. M. 1997. Breeding birds of Washington state. Washington state gap analysis—final report (K. M. Cassidy, C. E. Grue, M. R. Smith, and K. M. Dvornich, eds.), vol. 4. Seattle Audubon Soc. Publ. Zool. 1.

Sowls, A. L., DeGange, A. R., Nelson, J. W., and Lester, G. S. 1980. Catalog of California seabird colonies. U.S. Fish & Wildlife Serv., Biol. Surv. Prog. FWS/OBS-37/80.

Spear, L. B., Nur, N., and Ainley, D. G. 1992. Estimating absolute densities of flying seabirds using analyses of relative movement. Auk 109:385–389.

Spear, L. B., and Ainley, D. G. 1999. Migration routes of Sooty Shearwaters in the Pacific Ocean. Condor 101:205–218.

Speich, S. M., and Thompson, S. P. 1987. Impacts on waterbirds from the 1984 Columbia River and Whidbey Island, Washington, oil spills. W. Birds 18:109–116.

Speich, S. M., and Wahl, T. R. 1989. Catalog of Washington seabird colonies. U.S. Fish & Wildl. Serv., Biol. Rept. 88(6), MMS 89-0054.

Springer, A. M. 1998. Is it all climatic change? Why marine bird and mammal populations fluctuate in the North Pacific, in Proc. biotic impacts of extratropical climate variability in the Pacific (G. Halloway, P. Muller, and D. Henderson, eds.), pp. 109–119. SOEST spec. publ. 1998. SOEST, Univ. of Hawaii, Manoa Campus, Honolulu, HI 96826.

Tasker, M. L., Hope Jones, P., Dixon, T., and Blake, B. F. 1984. Counting seabirds at sea from ships: A review of methods employed and a suggestion for a standardized approach. Auk 101:567–577.

Thomson, R. E., Hickey, B. M., and LeBlond, P. H. 1989. The Vancouver Island coastal current: Fisheries barrier and conduit, in Effects of ocean variability on recruitment and an evaluation of parameters used in stock assessment models (R.

J. Beamish and G. A. McFarlane, eds.). Can. Spec. Publ. Fish. Aquat. Sci. 108:265–296.

Tweit, B., and Fix, D. 1991. Oregon–Washington region. Am. Birds 45:309–312.

Tweit, B., and Gilligan, J. 1998. Oregon–Washington Region. Natl. Audubon Soc. Field Notes 53:114–118.

Tweit, B., and Paulson, D. R. 1994. First report of the Washington Bird Records Committee. Wash. Birds 3:11–41.

Van Franeker, J. A. 1994. A comparison of methods for counting seabirds at sea in the southern ocean. J. Field Ornithol. 65:96–108.

Varoujean, D. H., II, and Williams, W. A. 1995. Abundance and distribution of Marbled Murrelets in Oregon and Washington based on aerial surveys, in Ecology and conservation of the Marbled Murrelet (C. J. Ralph, G. L. Hunt, Jr., M. G. Martin, and J. F. Piatt, eds.), pp. 327–338. Gen. Tech. Rep. PSW-GTR-152. U. S. Forest Service Pacific Southwest Research Station, Albany, CA.

Veit, R. R., McGowan, J. A., Ainley, D. G., Wahl, T. R., and Pyle, P. 1997. Apex marine predator declines ninety percent in association with changing oceanic climate. Global Change Biol. 3:23–28.

Vermeer, K., and Rankin, L. 1984. Population trends in nesting Double-crested and Pelagic cormorants in Canada. Murrelet 65:1–9.

Vermeer, K., Harfenist, A., Kaiser, G. W., and Nettleship, D. N. 1997. The reproductive biology, status, and conservation of seabirds breeding in the Queen Charlotte Islands: A summary, in The ecology, status and conservation of marine and shoreline birds of the Queen Charlotte Islands (K. Vermeer and K. H. Morgan, eds.), pp. 58–77. Can. Wildlife Serv. Occas. Paper 93.

Wahl, T. R. 1975. Seabirds in Washington's offshore zone. W. Birds 6:117–134.

Wahl, T. R. 1984. Distribution and abundance of seabirds over the continental shelf off Washington (including information on selected marine mammals). Wash. State Dept. Ecology, 300 Desmond Dr., Lacey, WA 98503.

Wahl, T. R. 1985. The distribution of Buller's Shearwater (*Puffinus bulleri*) in the North Pacific Ocean. Notornis 32:109–117.

Wahl, T. R., Ainley, D. G., Benedict, A. H., and DeGange, A. R. 1989. Associations between seabirds and water masses in the northern Pacific Ocean in summer. Mar. Biol. 103:1–17.

Wahl, T. R., and Heinemann, D. 1979. Seabirds and fishing vessels: Co-occurrence and attraction. Condor 81:390–396.

Wahl, T. R., Morgan, K. H., and Vermeer, K. 1993. Seabird distribution off British Columbia and Washington, in The status, ecology and conservation of marine birds of the North Pacific (K. Vermeer, K. T. Briggs, K. H. Morgan, and D. Siegel-Causey, eds.), pp. 39–47. Can. Wildlife Serv., Ottawa.

Wilson, U. W. 1991. Response of three seabird species to El Niño events and other warm episodes on the Washington coast, 1979–1990. Condor 93:853–858.

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DISTRIBUTION AND ABUNDANCE OF BURROWING OWLS ON THE PENINSULA AND ISLANDS OF BAJA CALIFORNIA

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ABSTRACT: We compiled 166 historical and recent records of Burrowing Owl sightings and/or specimens from 61 locations throughout the peninsula of Baja California and associated islands. Thirty-eight records are from the delta of the Colorado River, 57 from northwestern Baja California, 3 from the Central Desert, 12 from the Vizcaino Desert, and 12 from the Cape region. These records confirm that the Burrowing Owl is a widespread, albeit perhaps uncommon, resident the length of the peninsula. The larger aggregations have been reported from the central and northern portions of the peninsula, while the species is rather rare in the Cape region. About one half of the records of Burrowing Owls on the peninsula are from spring and summer. Forty-three percent of the records are from agricultural lands, 18% from wetlands, 15% from open desert, and 12% from coastal sage scrub.

In western North America the breeding range of the Burrowing Owl (*Athene cunicularia*) extends from southern interior British Columbia to Baja California, including many coastal islands, as well as Guadalupe Island, and south to central Mexico, including Clarión Island in the Revillagigedo group (Brewster 1902, Hang et al. 1993, Howell and Webb 1995, A.O.U. 1998). Burrowing Owls winter throughout their breeding range, except for the northern portions of the Great Basin and the Great Plains, and south to southern Mexico, Central, and South America (A.O.U. 1998).

The number of Burrowing Owls that breed in Canada and some parts of the U.S.A., including California, is declining (National Wildlife Federation 1989, Carter et al. 1996, James and Espie 1997, De Sante et al. 1997). It has been hypothesized that the major causes of such a decline have been habitat alterations and other human activities such as poisoning and loss of nest sites through the control of squirrels and prairie dogs (White 1994, see also Lincer 1997). In North America the Burrowing Owl has been designated as threatened widely throughout its range (James and Espie 1997). In Mexico the Burrowing Owl is listed as threatened in the 1994 official list of species at risk (NOM-059-ECOL-1994). Despite this designation, actual information on the status of this species in Mexico is scant (see Enriquez-Rocha 1997). If conservation plans for it are to be developed, more information is needed, especially from its wintering range.

Although the general distribution of the Burrowing Owl in the peninsula of Baja California is well known (see Grinnell 1928, and Wilbur 1987), specific habitats occupied and the abundance of owls are not. The Burrowing Owl was first recorded in the peninsula of Baja California by Baird et al. (1874) from the Cape region and by Sharpe (1875) from Magdalena Bay. Its status is poorly known over much of the peninsula, mostly because there has been

little observation effort and some potential habitats adjacent to coastal wetlands on the Pacific coast are not easily accessible. Analysis of its status as a breeding species is further complicated by the influx of migrants from the north, and all of Mexico is known to be an important wintering area (Enríquez-Rocha 1997).

In this paper we present an overview of the abundance and distribution of Burrowing Owls on the peninsula of Baja California and adjacent islands by using the information available in the literature, as well as our own unpublished field notes and those of others.

RESULTS AND DISCUSSION

We compiled 166 historical and recent records of Burrowing Owl sightings and/or specimens from 61 locations throughout the peninsula of Baja California, the islands in the northern and central Gulf of California (i. e., north of Cerralvo), and those on the Pacific coast of Baja California (Appendix 1, Figure 1). Thirty-eight records are from the delta of the Colorado River (including Mexicali Valley and San Felipe Desert), 57 from northwestern Baja California, 3 from the Central Desert, 12 from the Vizcaíno Desert, and 12 from the Cape region (see Roberts 1989 for a description of phytogeographical regions and map). These records confirm that the Burrowing Owl is a widespread, albeit perhaps uncommon, resident the length of the peninsula. The larger aggregations have been reported from the central and northern portions of the peninsula, while the species is rather rare in the Cape region (Appendix 1). About one half of the records of Burrowing Owls on the peninsula are from spring and summer.

Brewster (1902) considered the Burrowing Owl a rare bird in the Cape region, and stated that it "seems to be but little more numerously represented in the central and northern portions of the peninsula." In the Cape region, it was apparently confined to the low country near the coast (Brewster 1902). Grinnell (1928) and Wilbur (1987), 60 years later, also considered the Burrowing Owl a widespread resident, both on the mainland at low altitude and on most of the islands, common in the north and rather rare in the Cape district. More recently, however, Howell and Webb (1995) considered it common to fairly common from sea level to 2000 m above sea level, rather than restricted to the lowlands, without providing supportive records. We did not find any records of a high-altitude occurrence of Burrowing Owls.

As 39 records from 23 islands suggest, this owl occurs on most of the coastal islands from the Pacific coast of Baja California and on Guadalupe Island, but it is only a vagrant on 12 islands in the Gulf of California (Appendix 2). It is a common winter visitor to Tiburón and San Esteban islands (van Rossem 1945). Cody (1983) reported the species from seven Gulf islands of various sizes and characters (both land-bridge and non-land-bridge islands). Numerous records from boats suggest that this species commonly disperses over water, accounting for occurrences on Guadalupe and the non-land-bridge islands of the Gulf of California (P. Unitt pers. comm.). The only probable nesting record on an island in the Gulf of California is of an individual at a burrow with abundant pellets and feces at

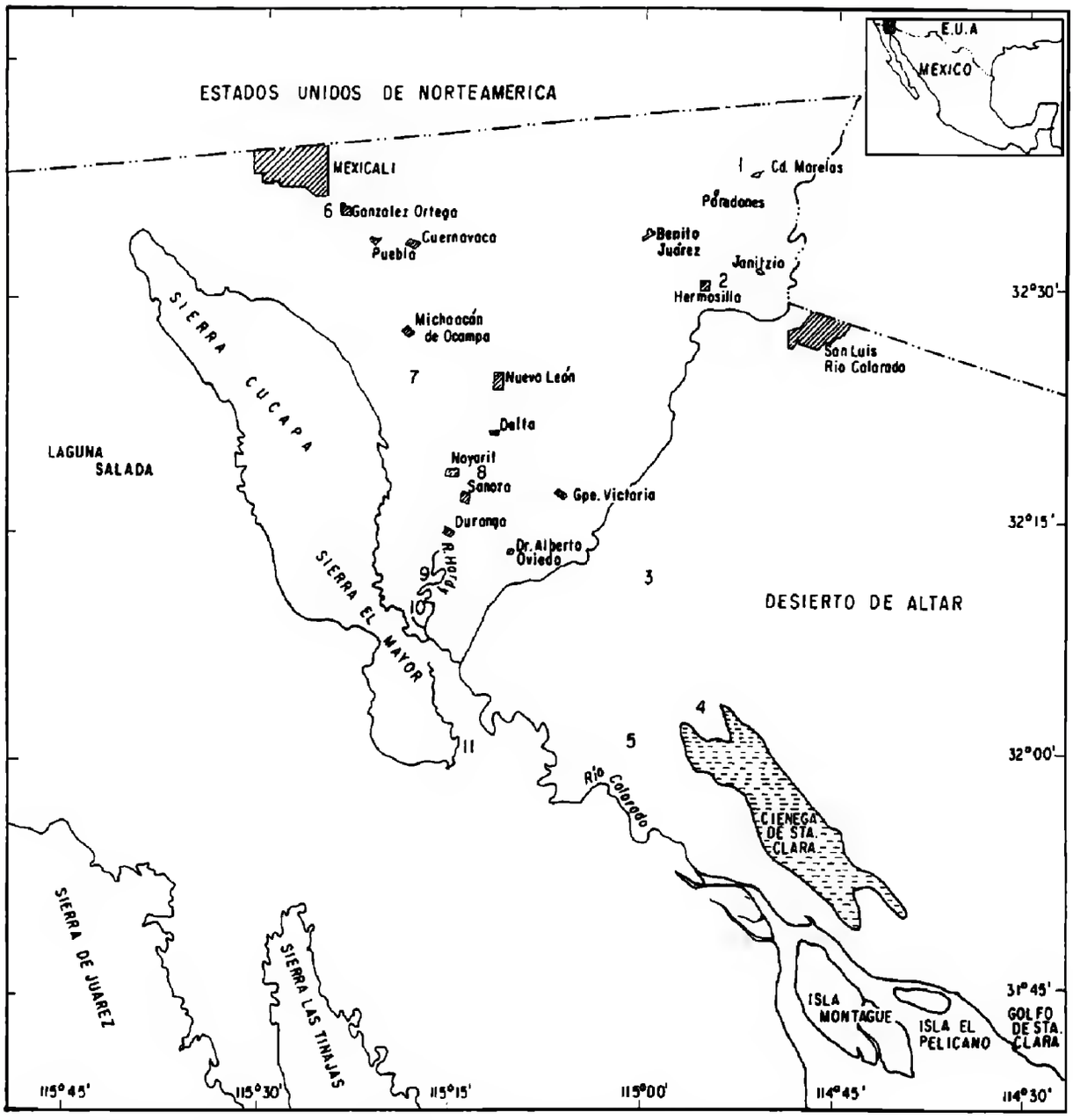

Figure 1. Burrowing Owl locations in the Mexicali Valley, Baja California. Numbers correspond to numbers in Appendix 1.

its entrance on Isla Piojo (Anderson pers. obs.). Burrows of the Black Chuckwalla (*Sauromalus hispidus*) are potential nesting sites for Burrowing Owls on gulf islands.

Anthony (1925), on his expedition to Guadalupe Island, visited all the coastal islands en route with the exception of San Geronimo and collected specimens at several locations on the mainland. He saw Burrowing Owls at San Quintín but not on the San Benitos, Natividad, and other nearshore islands where it had been reported as resident. Although his 1925 expedition extended from 9 July to 16 August, a time of year when these owls are less likely to be detected, he assumed that they had been exterminated by introduced cats. Neither Boswall (1978) nor Mellink (pers. obs. 11 July 1995) recorded any Burrowing Owls on these islands. The latter, however, noted large-scale habitat modification due to introduced domestic rabbits.

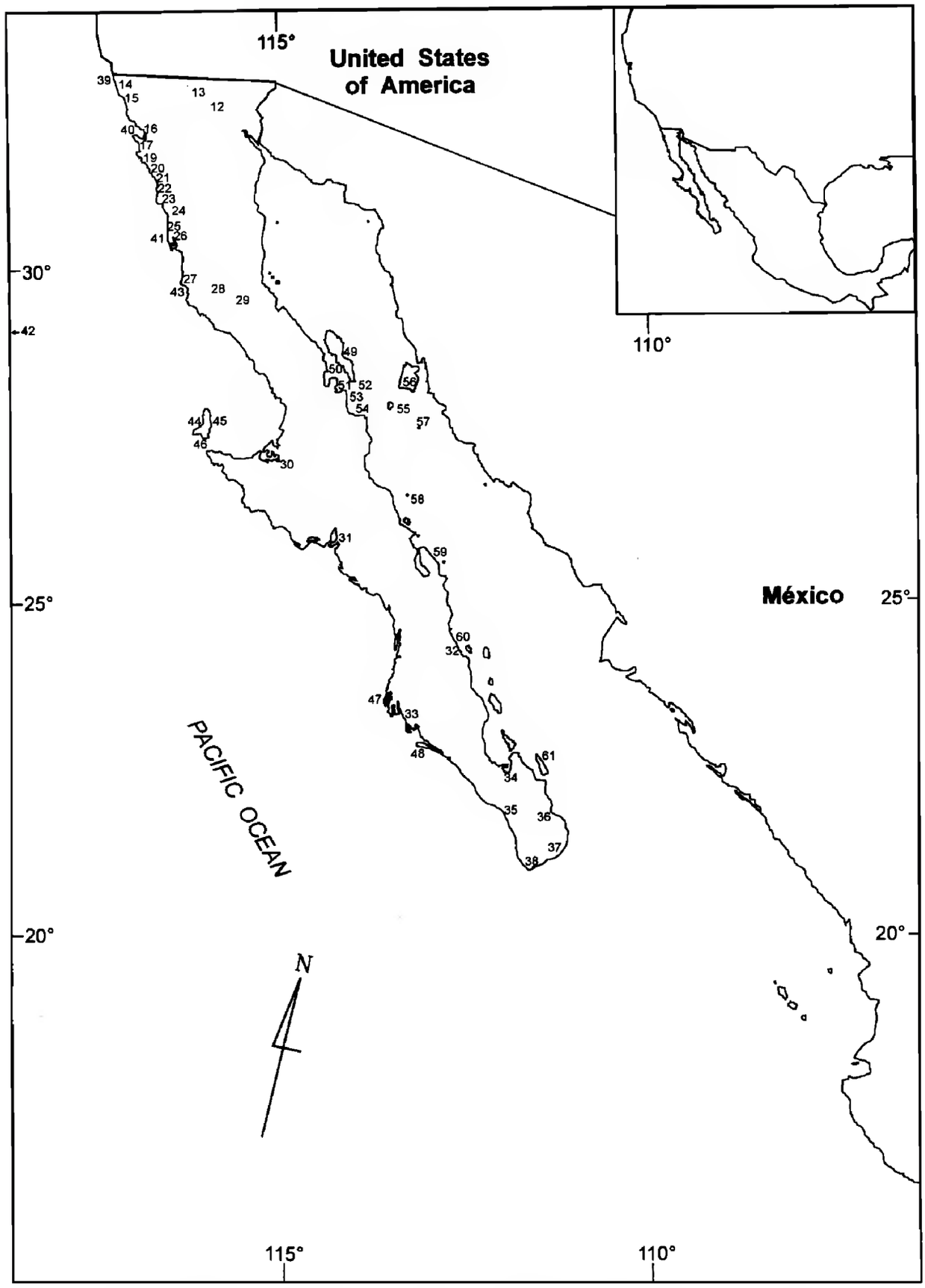

Figure 2. Burrowing Owl locations on the peninsula of Baja California and its associated islands, excluding the Mexicali Valley. Numbers correspond to numbers in Appendices 1 and 2.

Similarly, Bryant (1889) recorded Burrowing Owls on Santa Margarita Island, but Amador (1985) failed to observe them on any of his 21 visits (including 34 days of observation) from 1980 to 1984. On this island, feral cats prey upon nesting seabirds (Anderson et al. 1989).

The Burrowing Owl has been reported several times from Guadalupe Island, beginning with Bryant (1887). W. W. Brown's notes (in Thayer and Bangs 1908) on the Burrowing Owl in Guadalupe Island read "very common in the high, open, rocky country of the table lands, but not found in the pine or cypress woods." Apparently, the owl has endured the predation pressure from feral cats, as it is still widespread and common on the island (Jehl and Everett 1985). Mellink and Palacios (1990), however, did not see any owls on this island. Burrowing Owls occur also on Islote Negro, near the south end of Guadalupe (Jehl and Everett 1985).

In Baja California, Burrowing Owls have been recorded mostly on agricultural lands (43% of all records), especially along dirt embankments. They occur also in wetlands (18%), on open desert (15%), and in coastal sage scrub (12%). The largest concentration of Burrowing Owls (23 individuals) reported for Baja California was recorded during waterbird surveys along the Bordo Lerma flood-control dikes in the Mexicali Valley (Appendix 1, see Mellink et al. 1997 for a detailed map). This area and habitats are geographically and ecologically related to the Salton Sea area (Imperial Valley) where the species is widespread year round (Garrett and Dunn 1981, Rosenberg et al. 1991), although it is much less abundant in winter (P. Unitt pers. comm.). Along Bordo Lerma the winter population was much larger than that during the breeding season, although there was much variability within and between years (Mellink et al 1997). Local movements of Imperial Valley birds could account for the winter increase at Bordo Lerma.

In the Mexicali Valley, no Burrowing Owls were reported by Grinnell (1914), but van Rossem (1945) reported the species as a common breeder. Currently it is quite common and breeds in open areas near human habitation, especially along channel edges, including some in the city of Mexicali (Appendix 1). Therefore, the population of this owl in this area may actually have increased with the expansion of agriculture early this century (see Mellink 1995).

Although in low numbers, Burrowing Owls breed in the seven major coastal wetlands of Baja California: Punta Banda Estuary, San Quintín Bay, Ojo de Liebre (Scammon's) Lagoon, San Ignacio Lagoon, Magdalena Bay, La Paz Bay, and delta of the Colorado River. In these areas they prefer the upper salt marsh and playas with sand dunes (Massey and Palacios 1994). During May 1992 in San Ignacio Lagoon there were nine adult owls (including three pairs with two young each) along the sides of a road across the barren playa of the lagoon. The owl population at San Ignacio Lagoon is likely greater than in any other coastal wetland of Baja California, by virtue of the extensive playas that provide suitable habitat. To date, however, these playas have not been surveyed thoroughly. Recent (now abandoned) plans to construct the world's largest system of solar salt evaporation pond system at San Ignacio Lagoon would likely affect this population of resident Burrowing Owls, as well as Snowy Plovers (*Charadrius alexandrinus*; see Palacios et al. 1994).

Anthony (1893) saw Burrowing Owls "in several of the valleys between Tia Juana and San Telmo" between 27 May and 7 June 1893. At present most of these river valleys on the coastal plain of northwestern Baja California have been developed into housing and agriculture.

From the information presented, it is apparent that the Burrowing Owl is widespread though local in Baja California and that in some areas it has likely increased as a result of human transformation of the habitat. However, our information is scant and patchy, and comprehensive surveys, both during the breeding season and during the winter, remain to be done.

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LITERATURE CITED

Abarca, F. J., Ingraldi, M. F., and Varela-Romero, A. 1993. Observations on the desert pupfish (*Cyprinodon macularius*), Yuma Clapper Rail (*Rallus longirostris yumanensis*) and shorebird communities in the Ciénaga de Santa Clara, Sonora, Mexico. Ariz. Game & Fish Dept., Phoenix.

Allen, J. A. 1909. [Review of] Thayer and Bangs on the birds of Guadaloupe Island. Auk 26:319–320.

Amador, E. S. 1985. Avifauna de Isla Santa Margarita, B.C.S., México. Bachelor's thesis. Univ. Autónoma Baja Calif. Sur.

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Anderson, D. W., Keith, J. O., Trapp, G. R., Gress, F., and Moreno, L. A. 1989. Introduced small ground predators in California Brown Pelican colonies. Colonial Waterbirds 12:98–103.

Anthony, A. W. 1893. Birds of San Pedro Martir, Lower California. Zoe 4:228–247.

Anthony, A. W. 1895. Birds of San Fernando, Lower California. Auk 12:134–143.

Anthony, A. W. 1925. Expedition to Guadalupe Island, Mexico, in 1922. The birds and mammals. Proc. Calif. Acad. Sci. 14:277–320.

Baird, S. F., Brewer, T. M., and Ridgway, R. 1874. A history of North American birds, land birds. Little, Brown, Boston.

Bancroft, G. 1922. Some winter birds of the Colorado Delta. Condor 24:98.

Banks, R. C. 1963a. Birds of Cerralvo Island, Baja California. Condor 65:300–312.

Banks, R. C. 1963b. Birds of the Belvedere expedition to the Gulf of California. Trans. San Diego Soc. Nat. Hist. 13:49–60.

Brewster, W. 1902. Birds of the Cape region of Lower California. Bull. Mus. Comp. Zool. 41:1–241.

Bryant, W. E. 1886. Cerros Island. Forest and Stream 27:62–64.

Bryant, W. E. 1887. Additions to the ornithology of Guadalupe Island. Bull. Calif. Acad. Sci. 2:269–318.

Bryant, W. E. 1889. A catalogue of the birds of Lower California, Mexico. Proc. Calif. Acad. Sci. 2:237–320.

Carter, M., Fenwick, G., Hunter, C., Pashley, D., Petit, D., Price, J., and Trapp, J. 1996. For the future—WatchList 1996. Field Notes 50 (3).

Clark, R. J. 1997. A review of the taxonomy and distribution of the Burrowing Owl. J. Raptor Res. Reports 9:14–23.

Cody, M. 1983. The land birds, in Island Biogeography in the Sea of Cortez (T. J. Case and M. L. Cody, eds.), pp. 210–245, 455–473. Univ. of Calif. Press, Berkeley.

De Sante, D. F., Ruhlen, E. D., Adamany, S. L., Barton, K. M., and Amin, S. 1997. A census of Burrowing Owls in central California. J. Raptor Res. Reports 9:38–48.

Enriquez-Rocha, P. L. 1997. Seasonal records of the Burrowing Owl in Mexico. J. Raptor Res. Reports 9:49–51.

Escofet, A., Loya-Salinas, D. H., and Arredondo, J. I. 1988. El Estero de Punta Banda (Baja California, México) como habitat de la avifauna. Ciencias Marinas 14:73–100.

Garrett, K., and Dunn, J. 1981. Birds of Southern California. Los Angeles Audubon Soc., Los Angeles.

Grinnell, J. 1928. A distributional summation of the ornithology of Lower California. Univ. Calif. Publ. Zool. 32:1–300.

Hang, E. A., Millsap, B. A., and Martell, S. 1995. Burrowing Owl (*Speotyto cunicularia*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 16. Acad. Nat. Sci., Philadelphia.

Howell, A. B. 1911. Some birds of the San Quentin Bay region, Baja California. Condor 13:151–153, 211.

Howell, T. R., and Cade, T. J. 1954. The birds of Guadalupe Island in 1953. Condor 56:283–294.

Howell, S. N. G., and Webb, S. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, England.

James, P. C., and Espie, R. H. M. 1997. Current status of the Burrowing Owl in North America: An agency review. J. Raptor Res. Reports 9:3–5.

Jehl, J. R., Jr., and Everett, W. T. 1985. History and status of the avifauna of Isla Guadalupe, Mexico. Trans. San Diego Soc. Nat. Hist. 20:313–336.

Kaeding, H. B. 1905. Birds from the west coast of Lower California and adjacent islands. Condor 7:105–111, 134–138.

Lamb, C. C. 1927. Notes on some birds of the southern extremity of Lower California. Condor 29:155–157.

Lincer, J. L. 1997. Toward an action plan: The results of the Burrowing Owl Workshop, 14 November 1992, Bellevue, Washington. J. Raptor Res. Reports 9:11–13.

Massey, B. W., and Palacios, E. 1994. Avifauna of the wetlands of Baja California, Mexico: Current status. Studies Avian Biol. 15:45–57.

McGregor, R. C. 1897. Nest and eggs of the San Benito Sparrow. Osprey 2:42.

Mellink, E. 1995. Status of the muskrat in the Valle de Mexicali and Delta del Río Colorado, México. Calif. Fish and Game 81:33–38.

Mellink, E., and Palacios, E. 1990. Observations on Isla Guadalupe in November 1989. W. Birds 21:177–180.

Mellink, E., Palacios, E., and González, S. 1997. Nonbreeding waterbirds of the delta of the Río Colorado, México. J. Field Ornithol. 68:113–123.

Murphy, R. C. 1917. Natural history observations from the Mexican portion of the Colorado desert with a note on the Lower Californian pronghorn and a list of the birds. Proc. Linn. Soc. New York 24–25:43–101.

National Wildlife Federation. 1989. Proceedings of the Western Raptor Management Symposium and Workshop. Natl. Wildlife Fed. Tech. Ser. 12.

Palacios, E., Alfaro, L., and Page, G. W. 1994. Distribution and abundance of breeding Snowy Plovers on the Pacific coast of Baja California. J. Field Ornithol. 65:490–497.

Rosenberg, K. V., Ohmart, R. D., Hunter, W. C., and Anderson, B. W. 1991. Birds of the Lower Colorado River Valley. Univ. of Ariz. Press, Tucson.

Ruiz-Campos, G., and Rodríguez-Meraz, M. 1997. Composición taxonómica y ecológica de la avifauna de los ríos El Mayor y Hardy, y áreas adyacentes, en el Valle de Mexicali, Baja California, México. An. Inst. Biol. Univ. Nac. Autónoma Mex., Ser. Zool. 68:291–315.

Sharpe, R. B. 1875. Catalogue of the Striges, or nocturnal birds of prey, in the collection of the British Museum. Br. Mus., London.

Short, L. L., Jr., and Crossin, R. S. 1967. Notes on the avifauna of northwestern Baja California. Trans. San Diego Soc. Nat. Hist. 14:283–299.

Tershy, B. R., and Breese, D. 1997. The birds of San Pedro Martir Island, Gulf of California, México. W. Birds 28:96–107.

Thayer, J. E. 1909. [Letters from W. W. Brown, Jr.]. Condor 11:142–143.

Thayer, J. E., and Bangs, O. 1907. Catalog of birds collected by W. W. Brown, Jr., in middle Lower California. Condor 9:135–140.

Thayer, J. E., and Bangs, O. 1908. The present state of the ornis of Guadaloupe Island. Condor 10:101–106.

Townsend, C. H. 1923. Birds collected in Lower California. Bull. Am. Mus. Nat. Hist. 48:1–26.

Van Rossem, A. J. 1909. Some unrecorded species from Los Coronados Islands, Mexico. Condor 11:208.

Van Rossem, A. J. 1945. A distributional survey of the birds of Sonora, Mexico. Occ. Papers Mus. Zool. La. State Univ. 21:1–379.

White, C. M. 1994. Population trends and current status of selected western raptors. Studies Avian Biol. 15:161–172.

Wilbur, S. R. 1987. Birds of Baja California. Univ. Calif. Press, Berkeley.

Willett, G. 1913. Bird notes from the coast of northern Lower California. Condor 15:19–24, 184.

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Appendix 1. Historical and recent records of Burrowing Owls on the peninsula of Baja California, México.

Colorado Delta Region

1. Alamo River, 24 Jan 1928, 1, collected, riparian (Grinnell 1928; W. E. Ritter, MVZ 52115).
2. HW 2 Ejido Hermosillo, 28 Aug 1998, 15, agricultural (A. L. Mendez).
3. N of Estación Coahuila, 4 Jun 1998, 2, adult and young, agricultural (our data). Mexicali Valley, 10 May 1997, 19, agricultural (R. A. Hamilton, S.N.G. Howell); 11 Jun 1997, 2–3, agricultural (S. N. G. Howell, M. San Miguel); 3 Aug 1997, 4, agricultural (R. A. Erickson, R. A. Hamilton, S. N. G. Howell).
4. Ciénaga de Santa Clara–Wellton Mohawk Canal, 4 Jun 1998, 4, adults and young, riparian (our data). Discharge channel to the Ciénaga de Santa Clara, 13–17 Oct 1992, 6 (Abarca et al. 1993).
5. Bordo Lerma, 8 Sep 1993, 0; 2 Nov 1993, 0; 6 Dec 1993, 16; 11 Jan 1994, 23; 8–9 Feb 1994, 0; 22 Mar 1994, 9; 6 Apr 1994, 12, agricultural (our data); 1 Apr 1996, 3, agricultural (S. Detwiler). Colorado delta region, 29 Mar–19 Apr 1915, not uncommon, desert (Murphy 1917); 22–23 Jan 1922, present, agricultural (Bancroft 1922).
6. Mexicali (south end), 31 Mar 1994, 2, agricultural (our data). Colonia Robledo, 6 May 1996, 12, adults and young, agricultural (J. Luevano). Mexicali, 4 Sep 1995, 1 (S. N. G. Howell, K. A. Radamaker).
7. Cerro Prieto, 13 Mar 1991, 4, adults and young; 4 Jun 1998, 6, adults and young, agricultural (our data).
8. Between ejidos Nayarit and Sonora, 17 Jun 1997, 3; 7 Aug 1997, 2, agricultural (G. Ruiz-Campos).
9. Río Hardy, 3–4 Oct 1995, 4, riparian (J. Luévano). Río Hardy area, 22 Apr 1984, 3; 21 Aug 1984, 1; 28 Mar 1985, 1 (R. Webster). Cucapa Indigena, 5 Feb 1995, 1; 9 Sep 1995, 1 (Ruiz-Campos and Rodríguez-Meraz 1997). Between Rancho El Caiman and Highway 4, 22 Apr 1995, 4 (Ruiz-Campos and Rodríguez-Meraz 1997). Ejido Monterrey, 22 Apr 1995, 1 (Ruiz-Campos and Rodríguez-Meraz 1997).
10. El Mayor, 8 May 1971, 1, agricultural (Wilbur 1987).
11. Yuri Muri, south of Mexicali, 12 May 1981, 1, agricultural (our data). San Felipe road, 31 Mar 1994, 1, desert (our data).

Northwestern Baja California

12. Rancho Neji, 27 Apr 1995, 1, riparian (our data).
13. Tecate, summer 1996, 1, agricultural (our data).
14. Tijuana, 25 Dec 1903 (W. E. Ritter, MVZ 5929). Playas de Tijuana, summer 1987, 2, adult and young, coastal sage scrub (our data).
15. Rosarito, 16 Jul 1976, 2, coastal sage scrub, adult and young (Wilbur 1987).
16. San Antonio de Las Minas, 2 Nov 1996, 1, agricultural (our data). Between El Tigre and San Antonio de Las Minas, 21 May 1996, 4, agricultural (our data).
17. N of Ensenada, 15 May 1979, 1, coastal sage scrub (our data). Mouth of Arroyo Ensenada, 9 Jan 1994, 1 (R. A. Erickson, R. A. Hamilton, S. N. G. Howell, M. A. Patten, P. Pyle); 24 Feb 1985, 2, collected, sand dunes (G. Gómez, UABC). Laguna El Ciprés, 12 Oct 1988, 1, agricultural (our data); 2 Aug 1997, 1, agricultural (R. A. Erickson, R. A. Hamilton, S. N. G. Howell); 5 Oct 1997, 2, agricultural (our data); 20 Jul 1998, 2, adult and young, agricultural (our data). El Ciprés Airport, 2 Jul 1999, several, agricultural (R. A. Hamilton, S. N. G. Howell); 6 Jul 1999, a few, agricultural (R. A. Hamilton, S. N. G. Howell). On road to Punta Banda, just south of Ensenada, 3 Jan 1979, 1, irrigation dike (D. E. Schmoldt). Estero Punta Banda, spring–summer 1985, 1, wetland (Escofet et al. 1988); fall

1995, 1, wetland (G. Fernández); 10 Jan 1996, 1, wetland (S. N. G. Howell). Maneadero, 2 Jun 1996, 1, agricultural (our data). Valle de Maneadero, 18 Jul 1998, 6, adults and young, agricultural (our data). Punta Banda, between La Bufadora and Villarino, 6 Jan 1985, 1, chaparral/grass edge (D. E. Schmoldt).

18. Ojos Negros, 1–19 Apr 1967, 3, adults and young, riparian (Short and Crossin 1967); 22 Feb 1998, 2 pairs (R. A. Erickson, R. A. Hamilton, S. N. G. Howell). Marsh north of Ojos Negros, 14 Oct 1996, 2 (R. A. Erickson, R. A. Hamilton, S. N. G. Howell). Real del Castillo (old), 5 Jun 1995, 1; 5 Jun 1996, 1, agricultural (our data).
19. Santo Tomas, 4 Apr 1997, 1, agricultural (our data).
20. 7 km N of San Vicente, 6 Jul 1993, 1 (A. D. Barron, R. A. Erickson, T. E. Wurster). N of San Vicente, 9 Jul 1984, 3, adults and young, agricultural (our data).
21. San Antonio del Mar, 29 May 1991, 3, coastal sage scrub, adults and young (our data); 10 Jul 1996, 1, agricultural (our data).
22. Punta Colonet, 11 Jun 1996, 1, coastal sage scrub (our data).
23. San Telmo, 16 May 1996, 1, agricultural (our data).
24. Bocana de Santo Domingo, 18 Mar 1925, 1, riparian (A. E. Borell, MVZ 47243); 20 Jun 1980, 2, riparian (Wilbur 1987); 30 May 1993, 1, riparian (our data).
25. Field northeast of Laguna Figueroa, 26 Sep 1999, 1, agricultural (R. A. Hamilton, S. N. G. Howell). Laguna Figueroa south, 29 May 1993, 2, wetland (our data).
26. Bahía de San Quintín, 26 Apr–3 May 1910, several, coastal sage scrub–desert (Howell 1911); 18–21 Jul 1925, seen, coastal sage scrub–desert (Anthony 1925); 30 Nov 1974, 23 Dec 1974, 1, coastal sage scrub–desert (Wilbur 1987). San Quintín valley, 18 Dec 1981, 1, agricultural (our data). San Quintín, 29 Dec 1983, 4; 29 Jun 1984, 2; 3 Jul 1987, 1 juv.; 3 Jul 1992, 1 (R. E. Webster); 31 Mar 1996, 1, agricultural (our data). Mouth of Cañón de Agua Chiquita, 5 Jul 1991, 1, coastal sage scrub (our data). Bahía de San Quintín, Muelle Viejo, 9 Feb 1991, 18, agricultural; 16 Nov 1996, 1, coastal sage scrub (our data). Bahía de San Quintín, saltpond 1, 27 May 1993, 6, adults and young, coastal sage scrub; saltpond 3, 27 May 1993, 3, coastal sage scrub, adults and young (our data). Bahía de San Quintín, Punta Azufre, 29 May 1993, 1, wetland (our data). Bahía de San Quintín, English Graveyard, Aug 1995, 1, wetland (T. Donahoe). Bahía San Simon north, 29 May 1993, 1, wetland (our data).

Central Desert of Baja California

27. El Rosario, Nov 1906, 8, desert (Thayer and Bangs 1907).
28. Near San Fernando, 26 Apr–25 Jun 1894, a few, desert (Anthony 1895).
29, "San Jabier" (San Javier), Mar 1906, 8, desert (Thayer and Bangs 1907)

Vizcaino Desert

30. Guerrero Negro, 30 Jun 1975, 3, desert (Wilbur 1987); 16 Jan 1981, 1, desert (D. E. Schmoldt, Wilbur 1987). Estero de San José, W of Guerrero Negro, 8–10 Jan 1985, 2, old salt works (D. E. Schmoldt, Wilbur 1987). E shore of Estero de San Jose, W of Guerrero Negro, 8 Jan 1987, 1, old salt works (D. E. Schmoldt).
31. Laguna San Ignacio, 6–8 Feb 1979, 1, desert (K. Garrett, Wilbur 1987). Laguna San Ignacio NW, 29 May 1992, 7, adults and young, wetland (our data). Laguna San Ignacio, El Cardón, 20 May 1992, 1, desert (our data). Laguna San Ignacio, El Delgadito, 20 May 1992, 1, wetland (our data).
    Road to Punta Abreojos, 29 Mar 1998, 17, desert (L. Martinez). Isla Pelícanos, 1 May 1998, 1, desert (our data).
32. Loreto, 16 Feb 1991, 1 (A. D. Barron, R. A. Erickson, R. A. Hamilton).
33. Bahía Magdalena, before 1875, 1, desert (Sharpe 1875).

Cape Region

34, La Paz, 4 Apr 1887, 1, desert (Brewster 1902). 19 km N of La Paz, 8 Mar 1973, 2, desert (our data). Ejido Chametla, 5 Jun 1986, 1, desert (our data). Ejido Alfredo V. Bonfil, May 1991, 1 pair, abandoned field (J. Llinas). 3 km N of El Centenario, Feb 1998, 1 pair, desert (J. Llinas).
35. Todos Santos, 3 Oct 1923, 1, desert (Lamb 1927).
36. Miraflores, 20 Jan 1909, 3, subtropical deciduous scrub (Thayer 1909). Eureka, 20 Jan 1909, 1, subtropical deciduous scrub (Thayer 1909).
37. San José del Cabo, before 1874, ?, subtropical deciduous scrub (Baird et al. 1874); 26 Oct 1887, 1, subtropical deciduous scrub (Brewster 1902); 12 Apr 1923, 1, subtropical deciduous shrub (Lamb 1927).
38. Cabo San Lucas, before 1874, ?, subtropical deciduous scrub (Baird et al. 1874).

Appendix 2. Historical and recent records of Burrowing Owls on the offshore islands of Baja California peninsula (including those belonging to Sonora).

39. Los Coronados, 8 Apr 1909, 1 (van Rossem 1909, UCLA 11137).
40. Todos Santos, 10 Mar 1897, not uncommon (Kaeding 1905); 12 and 16 Jan 1927, 2, collected (Grinnell 1928, C. C. Lamb, MVZ 49817); 25 Jan 1980, 1; 2 Feb 1980, 1; 18 Feb 1981, 1, (R. LeValley); Todos Santos Sur, 27 Feb 2000, 1 (M. A. Patten, E. Mellink).
41. San Martín, 10 Feb 1979, 1 (K. Garrett and others).
42. Guadalupe, Jan 1885, 2, collected (Bryant 1887); 6 May–17 Jun 1902, 27 (Thayer and Bangs 1908); 16 May 1906 (J. A. Thayer, Field Museum of Natural History); 31 Jan 1950, 3; 11 Jun 1950, 2; 11 Jun 1953, 2 (Howell and Cade 1954); 18 Sep 1986, 1, collected (L. Quintana, UABC 350).
43. San Jerónimo, 14 Apr 1912, 1 (Willett 1913).
44. San Benitos, 27 Mar 1897, not common (Kaeding 1905); 30 Mar 1897, 1 (McGregor 1897); 9 Mar 1911, 1 (Townsend 1923); E San Benito, 21 Feb 1930 (UCLA 29819); W San Benito, 18 Dec 1973, 1 (Wilbur 1987);
45. Cedros, 7 Jan 1885, 1 (Bryant 1886).
46. Natividad, before 1925, resident (Anthony 1925).
47. Magdalena, March 1889, 1 or 2 (Bryant 1889).
48. Santa Margarita, 1 Mar 1889, 1 (Bryant 1889).
49. Ángel de la Guarda, 10 Apr 1911, 1 (Towsend 1923).
50. Piojo, 26 Mar 1974, 1 (our data).
51. Cardonosa, 27 Apr 2000, carcass (our data).
52, Rasa (Cody 1983).
53. Salsipuedes, 27 Apr 1978, 1 (our data); 20 Jan 1984, 1 (M. Harris).
54. San Lorenzo Norte (Las Ánimas), 1 Mar 1971, 1 (our data).
55. San Esteban, 12 Jan 1932, "common winter visitant" (van Rossem 1945, UCLA 38805).
56. Tiburón, winter 1932, "common winter visitant" (van Rossem 1945, Case in Cody 1983).
57. San Pedro Mártir (Cody 1983); 4–14 Mar 1992, 1 (Tershy and Breese 1997).
58. Tortuga, 29 Oct 1999, 1 (our data).
59. San Ildefonso, 24 Mar 1930, desert (J. E. Green, MVZ 57155); 1 (Case in Cody 1983).
60. Coronados, 3 Apr 1962 (Banks 1963b).
61. Cerralvo, 12 Feb 1906, 1 (Nelson and Goldman, USNM 197772, in Banks 1963b).

UPDATED GEOGRAPHIC DISTRIBUTION OF EIGHT PASSERINE SPECIES IN CENTRAL ALASKA

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ABSTRACT: We documented the occurrence of eight rare passerines in central Alaska. Our observations of the Yellow-bellied Flycatcher, Red-breasted Nuthatch, Arctic Warbler, Golden-crowned Kinglet, Tennessee Warbler, Palm Warbler, Mourning Warbler, and Clay-colored Sparrow, provided new distributional information on the occurrence of these species in central Alaska. Mist netting was essential to documenting the geographic distribution of these species because mist-net captures represented the only occurrence of several species. Additionally, many of these records could not have been identified to subspecies without collecting individuals as voucher specimens that could be verified by other scientists.

We used standardized mist-netting protocols to conduct intensive studies of the migration, population dynamics, and life histories of passerine birds in the Tanana River valley of central Alaska from 1992 to 1998. During these studies, we documented the occurrence of eight rare species. Here, we report captures and associated observations of these species that update our current understanding of the geographic distribution of these species in central Alaska.

STUDY AREA

The Tanana River valley is located in central Alaska and is bordered to the south by the Alaska Range and to the north by the Yukon–Tanana Uplands, an east/west highland of mature rounded hills (Figure 1). The Tanana valley is a well-documented migration corridor for many species of birds including Sandhill Cranes (*Grus canadensis*) (Kessel 1984), many species of waterfowl, shorebirds, passerines (Cooper and Ritchie 1995), and raptors (Cooper and Ritchie 1995, McIntyre and Ambrose 1999). Fairbanks is located near the confluence of the Chena and Tanana rivers at 130 m elevation. Tok and Scottie Creek are located in the Upper Tanana Valley (Figure 1) at elevations of 500 and 550 m, respectively.

The Fairbanks mist-netting station covered approximately 20 ha at Creamer's Field Migratory Waterfowl Refuge in Fairbanks (64° 50′ N, 147° 50′ W). A seasonally flooded wetland and a large agricultural field bordered the mist-netting station. The dominant tree species in the study site were Paper Birch (*Betula papyrifera*) White Spruce (*Picea glauca*), Balsam Poplar (*Populus balsamifera*), Trembling Aspen (*Populus tremuloides*), and willow (*Salix* spp.).

The Tok migration station was located 11 km west of Tok (63° 22′ N, 143° 12′ W) and 280 km SE of Fairbanks in a 65-ha patch of early

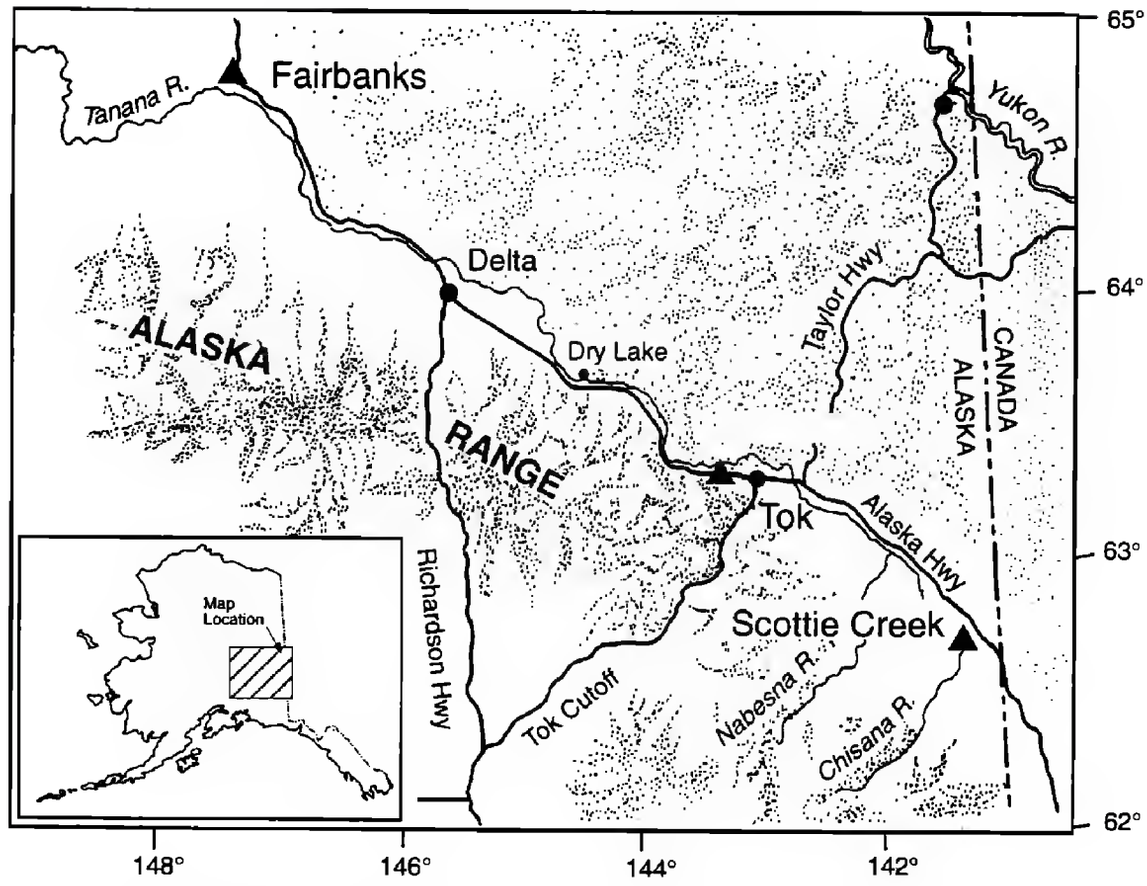

Figure 1. Location of the Fairbanks, Tok, and Scottie Creek mist-net stations (▲) in the Tanana Valley, Alaska.

successional deciduous forest on a hillside surrounded by closed forest of Black (*Picea mariana*) and White spruce.

The Scottie Creek mist-netting site was a station for monitoring avian productivity and survivorship (M.A.P.S.; DeSante et al. 1993) established along the Chisana River at the mouth of Scottie Creek (62° 41′ N, 141° 16′ W), near the Canadian border approximately 125 km SE of Tok. This site was located in a 400-ha stand of closed Balsam Poplar forest with an understory of open medium and tall willow and alder (*Alnus crispa*).

METHODS

At Fairbanks we conducted standardized mist netting from 1992 to 1998 using arrays of 22 to 50 standard (30 mm mesh, 2.6 m × 12 m) mist nets. During spring migration (25 April–15 June) we operated nets daily from 06:00 to 13:00. During summer (16 June–14 July) we operated nets once during five-day sampling periods from 06:00 to 13:00. During fall migration (15 July–30 September), nets were opened at sunrise and closed 7 hours later.

The Tok migration station consisted of up to 21 standard nets operated daily for 6 hours beginning at sunrise, from late April to early June during spring migration 1994–1998 and from late July to early October during fall migration 1993–1998.

The Scottie Creek M.A.P.S. station was operated once every 10 days from 10 June to 10 August 1993-1998 with 11 standard nets used in 1993 and 12 thereafter. The station was operated for 6 days in 1993, 1997, and 1998 and for 7 days in 1994, 1995, and 1996.

The 15 specimens we collected are deposited at the University of Alaska Museum (UAM), Fairbanks.

RESULTS

We banded 51,792 individuals of 65 species during 223,708 net hours of operation from 1992 to 1998 (Table 1).

Yellow-bellied Flycatcher (*Empidonax flaviventris*)

Our data indicate a recent range expansion of this species into east-central Alaska, where it is now known as a possible breeder and rare fall visitant. We netted nine individuals from 4 to 27 August in five of seven years. Four were in Fairbanks [20 August 1993 (UAM 6373, immature female), 13 August 1997 (UAM 7427, immature female), 15 August 1997, 27 August 1998], five in Tok [three 4–16 August 1994 (immature male collected 8 August 1994, UAM 6579), 23 August 1996, 27 August 1998]. From 10 to 28 June 1992–1998 we recorded two to nine singing males annually, for a total of 18 records, along the Richardson, Taylor, and Alaska highways. We collected one adult male at Mile 43 on the Taylor Highway (63° 49′ N, 142° 12′ W).

The Yellow-bellied Flycatcher was previously considered a casual summer visitant in eastern central Alaska, on the basis of a single record (Kessel and Gibson 1978). In British Columbia, the northernmost published records are south of approximately 54° N, except for one from near Fort Nelson in June 1982 and one near Atlin in August 1914 (Campbell et al. 1997).

Red-breasted Nuthatch (*Sitta canadensis*)

Banding and concurrent incidental observations suggest a recent range expansion of the Red-breasted Nuthatch into the Tanana Valley. We banded 19 individuals during three autumns, four in Fairbanks and 15 in Tok. Fifteen were banded in 1994, one in Fairbanks on 23 August, 14 in Tok from 11 to 26 August. In 1995, we banded one in Tok on 27 August and one each in Fairbanks on 2 August and 27 September Another bird was banded at

Table 1 Number of Birds Banded and Net-Hours of Operation at Tetlin National Wildlife Refuge and the Alaska Bird Observatory, 1992–1998

	Spring	Summer	Fall	Total
Individuals banded	9864	1498	40,430	51,792
Species banded	47	30	58	65
Net-hours	92,310	7249	124,149	223,708

Fairbanks on 11 August 1996. Of the 17 individuals that were aged, three were adults, and of the 16 individuals that were sexed, eight were male.

The irruption during 1994 was widely documented by observations of this species beginning in early August. Nuthatches were first observed during this time in the Upper Tanana Valley on 6 August, and they were seen or heard almost daily thereafter until mid-September at many locations. Numbers decreased from mid-September to mid-October, but birds were seen daily at several feeders in the Tok area until the arrival of severely cold weather (–60° F) in early December, after which they were again scarce. In Fairbanks, 25 individuals were recorded on the Christmas Bird Count in 1994, five in 1995, three in 1996, nine in 1997, and five in 1998. Additionally, this species has bred in the Tanana Valley since 1994 (B. Kessel pers. comm.).

The Red-breasted Nuthatch was previously considered a casual visitant in autumn in central Alaska (Kessel and Gibson 1978).

Arctic Warbler (*Phylloscopus borealis*)

The Arctic Warbler is more widely distributed in central Alaska than previously known. We captured 20 individuals in five of seven years, 15 in Fairbanks and 5 in Tok. All but two, on 9 June and 19 September, were from 10 to 27 August. The six individuals captured in 1994 included two on 15 August (UAM 6571) and one each on 22 August and 19 September (UAM 6570) in Fairbanks and one each on 16 and 22 August in Tok. In 1995 we banded one in Fairbanks on 16 August. In 1996 we netted four, on 9 June (UAM 6940) and 17 August in Fairbanks and on 10 and 21 August (UAM 6992) in Tok. In 1997 we banded five in Fairbanks (two on 17 August and one each on 18, 20, and 27 August) and one in Tok (15 August). In 1998, we banded three in Fairbanks, on 14, 17, and 18 August. Of these 20 individuals, four were adults, captured 9 June 1996, 10 August 1996, 16 August 1994, and 18 August 1997. The 9 June 1996 capture is noteworthy as an extremely early arrival date in central Alaska (cf. Paton et al. 1995).

Arctic Warblers breed commonly in subalpine habitats in central Alaska south of the Alaska Range, primarily west of the Richardson Highway (D. D. Gibson pers. comm.). Prior to this study there was only one record from the Tanana Valley, on 28 August 1963 (White and Brooks 1964), and none in eastern central Alaska or adjacent Canada (Godfrey 1986). All our specimens are *P. b. kennicotti*.

Golden-crowned Kinglet (*Regulus satrapa*)

Our mist-netting results suggest this species is a rare fall migrant in the Tanana Valley. We captured 13 individuals from 28 August to 30 September in five of seven years, three in Fairbanks and 10 in Tok. In 1994, two were in Tok (5 and 10 September); in 1995, two in Fairbanks (11 and 25 September) and three in Tok [28 August, 14 (UAM 6767) and 25 September); in 1996, one in Tok (26 September, UAM 6982); in 1997, one in Tok (30 September, UAM 8835); in 1998, one in Fairbanks (23 September) and three in Tok (8, 9, and 25 August). Only two of these birds were adults, those captured on 25 September 1995 and 9 September 1998. In addition to our banding results, a window-killed specimen was found in Fairbanks on 24 September 1997 (UAM 7355).

The Golden-crowned Kinglet was previously considered a casual summer and fall visitant in central Alaska (Kessel and Gibson 1978). Daniel D. Gibson of the University of Alaska Museum has identified these specimens as *R. s. amoenus*.

Tennessee Warbler (*Vermivora peregrina*)

Our studies support this species being a casual summer and fall visitant to central Alaska (Kessel and Gibson 1978). We captured two during this study, a first-year male on 10 August 1992 (UAM 6141) in Fairbanks and an adult male on 30 June 1995 at Scottie Creek. We recorded four additional Tennessee Warblers from central Alaska in 1995 and 1996: a singing male and secretive female observed 10–23 June 1995 at Mile 158 of the Richardson Highway, a singing male observed on 24 June 1995 near Delta Junction, and a singing adult male collected (UAM 6955) on 23 June 1996 at Mile 87 of the Taylor Highway (64° 07′ N, 141° 33′ W). The observations of the secretive female suggest this species may also breed in central Alaska.

Palm Warbler (*Dendroica palmarum*)

We netted two first-year birds in Fairbanks, a male on 25 September 1994 (UAM 6577) and a female on 14 September 1995 (UAM 6717); additionally, immature birds were netted at Dry Lake in the central Tanana Valley on 11 September 1991 (UAM 5939) and 16 October 1987. We identified all of these individuals as nominate *palmarum*. The Palm Warbler is a recent casual visitant throughout Alaska; most records are from southeastern Alaska, but there have been records as far west as Nunivak Island and as far north as Barrow (Gibson and Kessel 1992).

Mourning Warbler (*Oporornis philadelphia*)

We netted an immature male on 9 September 1992 in Fairbanks. The first substantiated record of a member of this genus in central Alaska, the specimen (UAM 6143) was identified by K. C. Parkes at Carnegie Museum of Natural History. There is only one previous Alaska record of this species, of a specimen collected 29 September 1987 at Middleton Island in the Gulf of Alaska (Gibson and Kessel 1992). This species has recently been found to be common during summer in the La Biche River drainage of extreme southeast Yukon Territory (Bowling 1995).

Clay-colored Sparrow (*Spizella pallida*)

The first confirmed central Alaska record of this species was of an adult male netted on 31 May 1995 (UAM 6706) in Tok. Prior to this study there were three records of the Clay-colored Sparrow in Alaska (Gibson and Kessel 1992). The northern extreme of the documented breeding range of this species is northeastern British Columbia and southwestern Northwest Territories, Canada (Godfrey 1986).

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LITERATURE CITED

Bowling, J. 1995. Summer season. British Columbia/Yukon region. Natl. Audubon Soc. Field Notes 49:966–970.

Campbell, R. W., Dawe, N. K., McTaggart-Cowan, I., Cooper, J. M., Kaiser, G. W., McNall, M. C. E., and Smith, G. E. I. 1997. The Birds of British Columbia, vol. 3. Univ. Br. Columbia Press, Vancouver.

Cooper, B. A., and Ritchie, R. J. 1995. The altitude of bird migration in east-central Alaska: A radar and visual study. J. Field Ornithol. 66:590–608.

DeSante, D.F., Burton, K. M., and Williams, O. E. 1993. The Monitoring Avian Productivity and Survivorship (MAPS) program, second annual report (1990 to 1991). Bird Populations 1:68–97.

Gibson, D. D., and Kessel, B. 1992. Seventy-four new avian taxa documented in Alaska 1976–1991. Condor 94:454–467.

Godfrey, E. W. 1986. The birds of Canada, rev. ed. Natl. Mus. Nat. Sci., Natl. Mus. Canada, Ottawa.

Kessel, B. 1984. Migration of Sandhill Cranes, *Grus canadensis*, in east-central Alaska, with routes through Alaska and western Canada. Can. Field-Nat. 98:279-282.

Kessel, B., and Gibson, D. D. 1978. Status and distribution of Alaska birds. Studies Avian Biol. 1

McIntyre, C. L., and R. E. Ambrose. 1999. Raptor migration in autumn through the Upper Tanana River Valley, Alaska. W. Birds 30:33–38.

Paton, P. W. C., Pogson, T. H., and Rexstad, E. 1995. Development of landbird-monitoring protocols for national parks in Alaska. Unpublished report to the National Park Service (order from Alaska Bird Observatory, P. O. Box 80505, Fairbanks, AK 99708).

White, C. M., and Brooks, W.S. 1964. Additional bird records for interior Alaska. Condor 66:308.

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THE RECENT BREEDING OF CALIFORNIA AND LAUGHING GULLS AT THE SALTON SEA, CALIFORNIA

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ABSTRACT: California Gulls successfully colonized the Salton Sea in 1997 with 22 nesting pairs near Obsidian Butte, extending their breeding range 650 km into one of the world's hottest environments. Although the colony site is often subjected to seasonal flooding, the number of nesting pairs has increased to at least 40 in 1999. One or two pairs of Laughing Gulls continue to nest sporadically although unsuccessfully; a nesting attempt in 1994 extended their range 50 km north into Riverside County.

The California Gull (*Larus californicus*) nests widely in the interior of western North America, south to Mono Lake, and along the coast at San Francisco Bay (AOU 1998, Winkler 1996). The breeding range of the Laughing Gull (*L. atricilla*) in western North America extends from the Salton Sea, California, northeastern Baja California Norte (Molina and Garrett unpubl. data), and Isla Montague in the northern Gulf of California (Mellink and Palacios 1992) south along the Pacific coast of Mexico (Howell and Webb 1995). Since the sporadic reports of up to 5 to 10 nesting pairs until the late 1950s (Small and Pyle 1952, Remsen 1978), the Laughing Gull has not bred at the Salton Sea, though it has remained a common postbreeding visitor in summer (Garrett and Dunn 1981). Here I describe a newly established nesting colony of California Gulls at the Salton Sea and document its breeding phenology, success, and growth from 1997 to 1999. This colony extends the species' successful breeding range some 650 km south into one of the world's hottest nesting environments (Grant 1982). I also describe recent nesting attempts by Laughing Gulls, including one at the north end of the sea, extending that species' breeding range 50 km north to Riverside County, California. While the Salton Sea supports large numbers of wintering Ring-billed (*L. delawarensis*), Herring (*L. argentatus*), and California Gulls, the recent colonization by the last represents the sea's first significant colony of breeding gulls.

CALIFORNIA GULLS

On 4 May 1997 I noted an aggregation of 40–50 California Gulls apparently nesting on a small unvegetated islet just offshore of Obsidian Butte, approximately 8 km northwest of Calipatria, Imperial Co. (Figure 1). This site had been used previously by nesting Gull-billed Terns (*Sterna nilotica*), Caspian Terns (*S. caspia*), Black Skimmers (*Rynchops niger*, Molina 1996), and, most recently, Brown Pelicans [*Pelecanus occidentalis*; nest-building attempts by three pairs in 1997, Salton Sea National Wildlife Refuge (NWR) files]. The islet's low-lying western perimeter forms a narrow peninsula composed largely of small boulders and rocks. Along this strip I

Figure 1. The T-shaped nesting islet (upper left) near Obsidian Butte, Imperial Co. The California Gull colony forms along the islet's seaward edge.

Photo courtesy Salton Sea National Wildlife Refuge

found 22 active (plus three abandoned) gull nests on my first visit on 15 May. The colony was oriented linearly along the rocky perimeter, and the distance from the nests to water's edge ranged from 1 to 4 m. Many of these nests were within the spray and surge zone during the strong winds prevalent in spring. Placed in relatively flat areas between rocks, the nests were composed of dried cane (*Phragmites* sp.) and lined with filamentous algae and feathers. The mean clutch size [± standard error (SE)] for the 22 active nests was 2.1 ± 0.2. The abandonment of three nests with eggs may have been due to inundation by waves.

To minimize disturbance to the colony I monitored its progress from the mainland shore at weekly intervals until fledging was complete. I surveyed it from a kayak on 19 June and 5 July (Figure 2), when I recorded 8 and 12 chicks, respectively, seeking shelter among the low boulders. This rocky, uneven substrate helped to conceal chicks, and the observed number is a conservative estimate of nesting success. On 19 June the chicks ranged from recent hatchlings to near fledging, suggesting marked asynchrony within the colony. On 31 July, my last visit, I noted a solitary nearly fledged chick swimming away from the islet but no further nesting activity.

At Obsidian Butte in 1998, I observed copulation and nest building by 2 May, although gulls in high breeding color were at the site in late April. I confirmed 37 active nests and the onset of hatching on 6 June. Using an interval from egg laying to hatching of 30–33 days (Winkler 1996), I estimated the earliest date of egg laying as 2–5 May for this year. The mean

Figure 2. California Gulls with juvenile (second from left) along rocky perimeter of Obsidian Butte islet, 5 July 1997.

Photo by Kathy Molina

clutch size (± SE) of 37 active nests in 1998 was 2.2 ± 0.09. On 28 June I counted the highest minimum of 15 chicks. In 1999 I noted nest building at this site by 16 April and confirmed 40 active nests (plus 5 abandoned attempts) on 21 May. Hatching had already commenced by my visit on 10 June. The mean clutch size (± SE) for 40 nests in 1999 was 2.5 ± 0.11. On 15 June I counted the highest minimum of 24 chicks.

The colony's orientation and nest composition in 1998 and 1999 were similar to those of 1997. Despite all nests in both years being farther from the water (> 5 m) than in 1997, shallow puddles persisted among many of them in late May, indicating that they were still well within the inundation zone.

Earlier nesting attempts by California Gulls have been reported from the Salton Sea. Small (1994) cited an undocumented and apparently unsuccessful attempt by one pair in the early 1970s. More recently I recorded the nesting attempts by one or two pairs on 7 June 1996 at the Johnson Street tern and skimmer colony (site described by Molina 1996) at the north end of the sea, Riverside Co. Here nest composition (dried cane, feathers, and a few twigs) was similar to that at Obsidian Butte, but nesting substrate and distance to water differed. One nest containing two eggs was placed on top of a bare earthen levee 3 m from the sea's surface. The second nest was placed on the floor of a dry and sparsely vegetated impoundment surrounded by an earthen wall 2 m high. The single egg in this nest was obviously abandoned when I found it. By 28 June the levee nest contained two recently hatched nestlings; I estimated the largest, at 44 g, to be ≤ 2 days old. By 12 July I found one desiccated chick (LACM 110635) at the levee nest and no further evidence of

the other chick or the adults; I presumed that this attempt was unsuccessful. I estimated an egg-laying date between 25 and 27 May, nearly a month later than the successful nests at Obsidian Butte.

Additional attempts by California Gulls to nest at the Rock Hill tern and skimmer colony at the Salton Sea NWR (three to four attempts each during May of 1998 and 1999) have been discouraged by the refuge's personnel since in recent years California Gulls have begun to prey on tern chicks (pers. obs.).

LAUGHING GULLS

Miller and van Rossem (1929) described the first nesting of several pairs of Laughing Gulls at the Salton Sea on 9 June 1928. A few pairs continued to nest sporadically up until the late 1950s, when American White Pelicans (*Pelecanus erythrorhynchos*) and Caspian Terns also ceased to nest along the south end of the sea (Remsen 1978). While visiting the Johnson Street colony on 5 August 1994, Ken Sturm and I discovered a large stick nest under an *Allenrolfea* shrub containing two recently hatched Laughing Gulls, one of which was freshly dead (LACM 108310). The larger chick survived until at least 12 August, when it regurgitated two small *Tilapia* during examination. By 23 August I could find neither it nor mobbing adults. I encountered no further breeding evidence for this species until 27 May 1999, when a single pair nested at Salton Sea NWR. This two-egg clutch failed to hatch, although the adults continued to attend it until 15 July.

DISCUSSION

With the recent establishment of the Obsidian Butte colony at the Salton Sea, the California Gull has expanded its breeding range south into the one of the world's harshest nesting environments (Grant 1982). Although at the Salton Sea eggs and hatchlings can be vulnerable to even brief periods of exposure to the sun, and thus require nearly constant attendance, a variety of charadriiform birds nests successfully at the sea. The proximity of nest sites to water for brief episodes of belly soaking and adequate exposure to breezes are believed to enhance evaporative cooling for adult stilts, avocets, plovers, and terns at the Salton Sea, where ambient temperatures during the nesting season commonly exceed birds' body temperature (Grant 1982). At Rock Hill off-duty mates of nesting gulls, like those of terns and skimmers, often rested at the shore near their nests, with legs and feet submerged in water. Although Gull-billed Terns and Black Skimmers frequently, but briefly, left their nests to drink and wet their extremities and bellies (Molina 1999) I have not observed nest-attending gulls to interrupt incubation to do so.

Gulls at Obsidian Butte nested on a low windward strip of rocks and boulders, often subjected to flooding during high winds. The near-water placement and phenology of nests at Obsidian Butte differed from the unsuccessful attempts at Johnson Street. At the latter, two of the three unsuccessful attempts by gulls occurred at the base of an impoundment and were surrounded by a wall 2 m high that blocked the wind. Additionally, incubation at Obsidian Butte was predominantly in May, whereas at Johnson

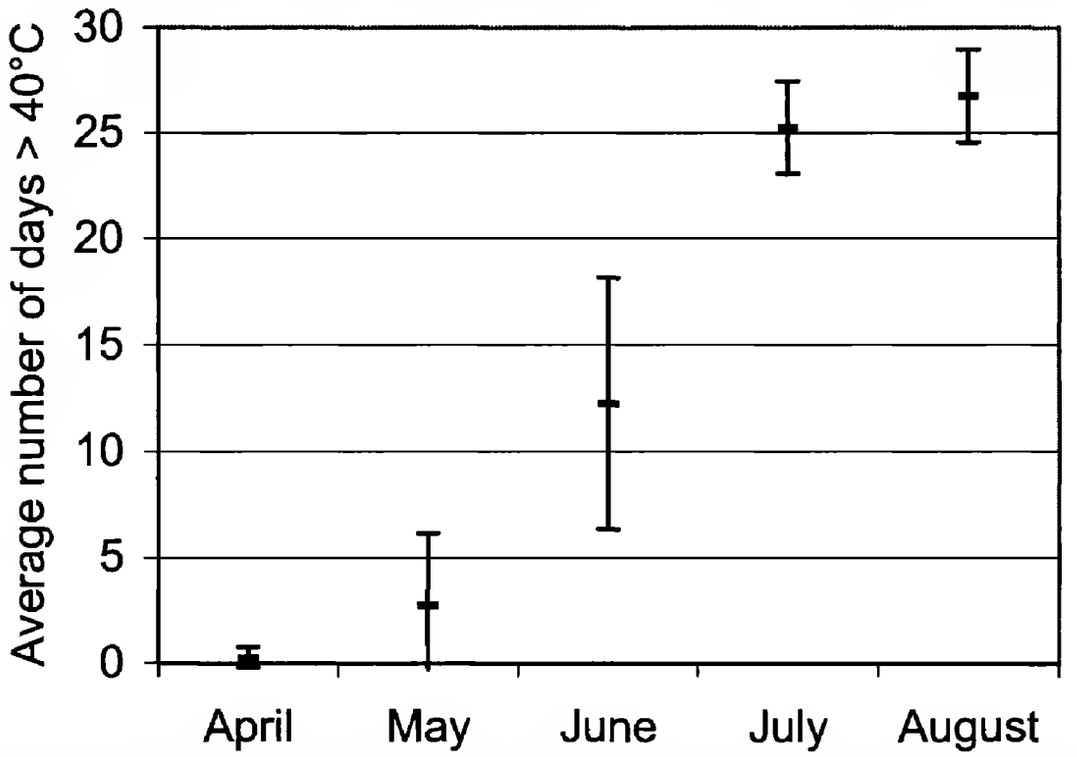

Figure 3. Mean number of days per month (± standard deviation) in which ambient temperature maxima (measured at Imperial Airport) reached or exceeded a gull's mean body temperature (41°C), 1995–1998.

it was in June and July, months in which the number of days with ambient temperatures reaching or exceeding 41°C, a mean body temperature calculated for larids on the basis of McNab (1966), increased three- and eightfold, respectively, over that for May (Figure 3). Hand et al. (1981) believed that proximity to water with unobstructed exposure to convective air currents ameliorated the effects of intense solar radiation for Yellow-footed Gulls (*L. livens*), nesting in the Gulf of California. Variation in chick mortality among nesting subcolonies of Western Gulls (*L. occidentalis*) on the California Channel Islands during an unusual heat wave was thought to be due to variation in nest-site microclimate (Salzman 1982). However, Jehl and Mahoney (1987) believed that predation risk, rather than variation in nest-site microclimate, was responsible for California Gulls' selection of nest sites at Mono Lake. Although quantitative data for the Salton Sea gull-nesting sites are lacking, differences in nest substrate and location and the timing of nesting could lead to important differences in exposure to wind and sun. Because microenvironmental variation may have important consequences for adults' and chicks' thermoregulation and, ultimately, nest success at the Salton Sea, nest-site selection by larids deserves further investigation.

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LITERATURE CITED

American Ornithologists' Union. 1998. Checklist of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D. C.

Dawson, W. L. 1923. The Birds of California, vol. 4. South Moulton Co., Los Angeles.

Garrett, K., and Dunn, J. 1981. Birds of Southern California: Status and Distribution. Los Angeles Audubon Soc., Los Angeles.

Grant, G. S., and Hogg, N. 1976. Behavior of late-nesting Black Skimmers at Salton Sea, California. W. Birds 7:73–80.

Grant, G. S. 1982. Avian incubation: Egg temperature, nest humidity, and behavioral thermoregulation in a hot environment. Ornithol. Monogr. 30.

Hand, J. L., Hunt, G. L., Jr., and Warner, M. 1981. Thermal stress and predation: Influences on the structure of a gull colony and possibly on breeding distributions. Condor 83:193–203.

Howell, S. N. G., and Webb, S. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, England.

Jehl, J. R., Jr., and Mahoney, S. A. 1987. The roles of thermal environment and predation in habitat choice in the California Gull. Condor 89:850–862.

McNab, B. K. 1966. An analysis of the body temperatures of birds. Condor 68:47–55.

Miller, L., and van Rossem, A. J. 1929. Nesting of the Laughing Gull in southern California. Condor 31:141–142.

Molina, K. C. 1996. Population status and breeding biology of Black Skimmers at the Salton Sea, California. W. Birds 27:143–158.

Molina, K. C. 1999. An exploration of parental investment hypotheses using Gull-billed Terns and Black Skimmers (Aves: Laridae) at the Salton Sea, California. M. S. thesis, Calif. State Univ., Northridge.

Palacios, E., and Mellink, E. 1992. Breeding bird records from Montague Island, northern Gulf of California. W. Birds 23:41–44.

Remsen, J. V., Jr. 1978. Bird species of special concern in California. Calif. Dept. Fish & Game Nongame Wildlife Invest. 78-1.

Salzman, A. G. 1982. The selective importance of heat stress in gull nest location. Ecology 63:742–751.

Small, A., and Pyle, R. L. 1952. Southern Pacific Coast Region. Audubon Field Notes 5:308.

Small, A. 1994. California Birds: Their Status and Distribution. Ibis Publ., Vista, CA.

Winkler, D. W. 1996. California Gull (*Larus californicus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 259. Acad. Nat. Sci., Philadelphia.

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NOTES

FIRST RECORD OF AN OLIVE-BACKED PIPIT IN CALIFORNIA

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The first Olive-backed Pipit (*Anthus hodgsoni*) recorded in California was banded on 26 September 1998 on Southeast Farallon Island, 42 km west of San Francisco. The bird arrived just prior to the largest wave of migrants on the Farallones in ten years as hundreds of western birds and several eastern vagrants descended on the island during the next five days. During this period, no Red-throated Pipits (*A. cervinus*) and only small numbers of American Pipits (*A. rubescens*) were observed. The Olive-backed Pipit was seen each day through 29 September.

The bird was first seen at 14:50 on the 26th by Burnett when it flushed from underneath a Monterey Cypress (*Cupressus macrocarpa*) and flew toward the east end of the island in undulating flight, twice giving a long, buzzy call ("zzrrring") unfamiliar to Burnett. An hour later, Capitolo flushed the bird from under a patch of bush mallow (*Lavatera* sp.). It called once upon take-off ("szeeeeep") and flew to the marine terrace, a flat area of low ground cover consisting primarily of Farallon Weed (*Lasthenia minor maritima*) and plantain (*Plantago* sp.). Capitolo quickly refound the bird and identified it as a pipit by its white and brownish olive plumage, slender bill, and tail-pumping behavior but was unable to identify it to species. Only Pyle had prior experience identifying Olive-backed Pipits, but he did not arrive on the island until the following day. At 16:45, Capitolo and Richardson refound the bird on the terrace and were joined by Burnett.

With the sun at our backs, we observed the bird at close range with binoculars and a spotting scope while it foraged on the terrace. The bird walked quickly between patches of plantain, often remaining out of view for several minutes before briefly reappearing at the edge of a patch, pumping its tail. It then slinked away to new cover, holding its tail nearly horizontal and bobbing its head like a pigeon. During this time, Richardson noted the greenish back and black brow to the supercilium through his spotting scope and tentatively identified it as an Olive-backed Pipit. We recorded field notes while following the bird and attempting to direct it back toward the mist net. At 18:00, the bird flew back into the bush mallow and was promptly caught in the net.

Using Svensson (1992) we confirmed the identification and telephoned Keith Hansen for assistance. We banded the bird, took measurements and photographs, pulled two ventral body feathers, and released it just before 19:00. Though secretive, the bird was sighted on the marine terrace each of the next three days, and Pyle was able to obtain photographs of the bird in the field. The feathers were deposited at the California Academy of Sciences (CAS) in San Francisco (accession number 87088), and this record was accepted by the California Bird Records Committee.

The bird (Figure 1) was in first basic plumage with a partially pneumatized skull and no indication of active molt. The upperparts were olive green and faintly streaked, with heavy black flecking on the crown. The broad supercilium was white behind the eye, orange-buff in front of the eye, and was bordered above by a thin black brow. The auriculars were olive brown with a whitish patch at the upper rear, just below and behind the end of the supercilium. A blackish spot was immediately below this patch. A buff-white submoustachial stripe and throat were set off by a thin but distinct black

Figure 1. Olive-backed Pipit (*Anthus hodgsoni*), Southeast Farallon Island, California, 26 September 1998. Though not diagnostic, the pale and dark rear auricular spots and the dark brow to the supercilium are important field marks. The difference between primary 6 and the tip of the wing (primary 8; see text) suggests the subspecies *yunnanensis*, as this difference is usually <1 mm in *A. h. hodgsoni*.

Photo by Dan Murley

malar stripe. The breast was buff with bold black streaks that became thinner then ended abruptly at the white belly. The flanks were washed buff with streaks prominent but paler and more diffuse than those on the breast. The flight feathers were edged greenish, and the wingbars were buff, the upper more pronounced. The undertail coverts were white. The inner web of the outer rectrices and the tips of the adjacent pair were dusky white. Left rectrix 4 also had a small amount of white at its tip. The upper mandible was dark, the lower pinkish with a dark tip. The legs were pink.

We recorded the following measurements: bill length from nostril 8.7 mm; exposed culmen 11.0 mm; hind claw 8.3 mm; bill depth at posterior edge of nostrils 4.1 mm; bill depth at anterior edge of nostrils 3.5 mm; bill width at posterior edge of nostrils 4.5 mm; bill width at anterior edge of nostrils 3.1 mm; wing chord 82 mm; tail 62

mm; weight (with band) 21.0 g. Primary 10 (numbered distally) was reduced. Primary 8 was longest and greater than primary 7 by more than 1 mm.

The Olive-backed Pipit is readily distinguished from all other pipits by the combination of the olive-green upperparts, a broad supercilium that is orange-buff in front of the eye and white behind the eye, and a hind claw that is shorter than the hind toe. The rear auricular spots are also important field marks, though the white spot is sometimes absent and the dark spot can be indistinct. The Olive-backed Pipit is most subject to confusion with the Tree Pipit (*A. trivialis*), particularly in badly worn plumage. The Tree Pipit can also show a white spot on the upper rear auriculars, has a similar posture and gait, a similar call, and is the only other pipit whose hind claw is shorter than the hind toe (Cramp 1988). Though it has only a faint olive tinge to the upperparts and its supercilium is narrower and uniformly buff, feather wear can cause the upperparts to appear more olive in tone and the supercilium paler. Badly worn Olive-backed Pipits may show no olive but rather browner and grayer upperparts, a faded facial pattern, and little contrast between the rear and front of the supercilium (King 1981). The Farallon bird was in fresh plumage with distinct facial markings. Wing formula can also be helpful in distinguishing these species, as primary 6 is usually not more than 3 mm shorter than the tip of the wing in the Olive-backed and is 2–6.5 mm shorter in the Tree (Svensson 1992). This measurement was near 2 mm on the Farallon bird, as primary 7 was measured more than 1 mm shorter than the tip of the wing and photographs show primary 6 to be a similar distance shorter than primary 7 (Figure 1). The Tree Pipit, furthermore, can be difficult to distinguish from the Meadow Pipit (*A. pratensis*), with identification determined by flight call or hind claw length. The Meadow Pipit, however, breeding in Greenland and Europe, is less likely to occur as a vagrant in western North America, while the Tree Pipit breeds farther east into southern central Siberia (King 1981), and an individual has reached Alaska (Kessel 1989).

The four other species of pipits occurring in western North America are easily distinguished from the Olive-backed Pipit. In fall the Red-throated Pipit differs by having dark brown upperparts with broad, conspicuous black and buff streaks and fairly uniformly buff underparts. Its flight call is similar, but the Olive-backed's is louder with a distinctive buzzy or reedy quality that the Red-throated's thin, high-pitched "seeep" lacks (King 1981, Pyle pers. obs.). The Pechora Pipit (*A. gustavi*) is a casual migrant to the western Aleutian Islands (AOU 1998) and is therefore a potential vagrant to California. It resembles the fall Red-throated Pipit, but, as in the Olive-backed Pipit, its buffy breast contrasts with a whitish throat and belly. The Sprague's Pipit (*A. spragueii*) has sandy or buffy brown upperparts, a plain buffy face, and narrow streaks on the breast that do not extend down the flanks. The American Pipit has grayer upperparts, darker and more uniform supercilium and underparts, darker legs, and a different call (King 1981). However, the race *japonicus*, a probable vagrant from Asia, suspected on the Farallones four times from 1990 to 1999, can show bright pink legs (M. Heindel pers. comm.).

Two subspecies of the Olive-backed Pipit are recognized. *A. h. hodgsoni* has a much more distinctly streaked back and crown than *A. h. yunnanensis*. Nominate *hodgsoni* also has an unstreaked rump, and the streaking on its underparts extends farther down the belly than in *yunnanensis*. Primary 6 is usually less than 1 mm shorter than the tip of the wing in *hodgsoni*, 1–3 mm shorter in *yunnanensis* (Svensson 1992). This difference was approximately 2 mm on the Farallon bird (see above). The faintly streaked back and rump also suggest this bird was *yunnanensis* (Figure 2), though the faint streaking on the rump may be difficult to distinguish from the unstreaked rump of *hodgsoni*. The difference in back streaking, however, was obvious on specimens of both subspecies we viewed at CAS.

Nominate *hodgsoni* breeds in southern Asia, from the Himalayas to central and eastern China and Japan; *yunnanensis* breeds in northern Eurasia, east to Kamchatka

Figure 2. Olive-backed Pipit (*Anthus hodgsoni*), Southeast Farallon Island, California, 26 September 1998. The faintly streaked upperparts also suggest *yunnanensis*.

Photo by Dan Murley

and south to Mongolia, Manchuria, Ussuriland, and northern Japan. Their wintering ranges overlap in southern Japan, the Philippines, and peninsular India, with *hodgsoni* also wintering in the Ryukyu Islands, Taiwan, and Indochina. Birds of unknown race winter in Borneo and southern Korea (Cramp 1988). The Olive-backed Pipit is regular in fall in Israel, and, though considered accidental across most of Europe, annual in Britain. In Britain and Ireland, over 90% of records are for fall, mostly late September and October (Snow and Perrins 1998). Svensson (1992) stated that all vagrants in Europe are probably *yunnanensis*.

The first North American record of the Olive-backed Pipit was on 1 June 1962 on St. Lawrence Island, Alaska (Sealy et al. 1971), and upon collection was determined to be *yunnanensis*. *A. h. yunnanensis* is an irregular spring and fall migrant to Alaska's western Aleutian Islands, typically occurring singly or in small numbers (D. Gibson pers. comm.) but with a remarkable count of 225 on Attu Island on 17 May 1998 (Tobish 1998). East of the western Aleutian Islands the species is accidental, and an adult *yunnanensis* banded 27 July 1998 at Mother Goose Lake, Alaska Peninsula, was the first documented record for Alaska's mainland (Tobish 1999, D. Gibson pers. comm.). Other fall records within the political boundaries of North America include 12–15 birds photographed on Kure Atoll, Hawaii, in late September and early October of 1983 (Pyle 1984) and an individual at Cataviña in Baja California, Mexico, 18–19 October 1996 (Hamilton et al. 2000). Finally, a specimen of *A. h. yunnanensis* collected 10 miles south of Reno, Nevada, in spring on 16 May 1967 (Burleigh 1968) suggests, as noted by Roberson (1980), that this species has successfully wintered within the New World before.

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Refuge. We also thank Keith Hansen for his assistance in identification and for spreading the word on the mainland. Thanks also go to Robb Hamilton and Matt Heindel for reviewing earlier drafts of this paper. Dan Murley provided photographs of the bird, Doug Long permitted us to view specimens at CAS, and Daniel Gibson provided information on the Olive-backed Pipit's status in Alaska. The U.S. Geological Survey (Dixon Field Station) provided computer support. This is Point Reyes Bird Observatory contribution 747.

LITERATURE CITED

American Ornithologists' Union. 1998. Checklist of North American Birds. 7th ed. Am. Ornithol. Union, Washington, D.C.

Burleigh, T. D. 1968. The Indian Tree Pipit (*Anthus hodgsoni*) recorded for the first time in North America. Auk 85:323.

Cramp, S. 1988. Handbook of the Birds of Europe, the Middle East, and North Africa, vol. V. Oxford Univ. Press, Oxford, England.

Hamilton, R. A., Pike, J. E., Wurster, T. E., and Radamaker, K. 2000. First record of an Olive-backed Pipit in Mexico. W. Birds 31:117–119.

Kessel, B. 1989. Birds of the Seward Peninsula, Alaska, Their Biogeography, Seasonality, and Natural History. Univ. Alaska Press, Fairbanks.

King, B. 1981. The field identification of North American pipits. Am. Birds 35:778–788.

Pyle, P. 1984. Observations of migrant and vagrant birds from Kure and Midway atolls, 1982–1983. 'Elepaio 44:107–111.

Roberson, D. 1980. Rare Birds of the West Coast of North America. Woodcock Publ., Pacific Grove, CA.

Sealy, S. G., Bedard, J., Udvardy, M. D. F., and Fay, F. H. 1971. New records and zoogeographical notes on the birds of St. Lawrence Island, Bering Sea. Condor 73:322–336.

Snow, D. W., and Perrins, C. M. 1998. The Birds of the Western Palearctic, concise ed., Vol. 2. Oxford Univ. Press, Oxford, England.

Svensson, L. 1992. Identification Guide to European Passerines, 4th ed. L. Svensson, Stockholm.

Tobish Jr., T.G. 1998. Alaska region. Field Notes 52:372–375.

Tobish Jr., T.G. 1999. Alaska region. Field Notes 53:89–91.

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For an undertaking this immense and complex, I found surprisingly few points to quibble about. Most of my criticisms concern cases in which the images shown are either at odds with, or are not explained by, the narration or text. For example, narration concerning the extent of black in the wingtips of adult Mew and Ring-billed Gulls accompanies a photo caption stating "white in wingtip," while comparison of "adult and 1st-winter" Black-legged Kittiwakes accompanies photos captioned "adult" and "1st-alternate." On the images of the Kamchatka (*Larus canus kamtschatschensis*) and Common (*L. c. canus*) Mew Gulls presented, I was unable to discern a clear difference in primary pattern, even though the narration stated that the "white wedge that separates the gray bases from the black distal portions of the central primaries" in the Kamchatka is supposedly lacking in the Common. Images of a leucistic Heermann's Gull were not labeled as such and were shown during narration concerning the species' breeding range, while an adult Ring-billed Gull with a dark eye was labeled as such but was not discussed at all in the narration. I applaud the number of images, and the amount of discussion, of unusual variation in this video, but showing such images without explanation may result in confusion for some viewers. In a few cases, attempts to illustrate a narrative point failed visually because the image did not clearly show the character in question. For example, one of the two composite images comparing the relative sizes of the white primary tips of adult Mew and Ring-billed Gulls failed to show the difference described. The addition of date and location to some cuts is very welcome, but I suggest these data be mandatory for all cuts and photos, not simply some. Similar criticisms were pointed out in a review of *The Large Gulls* (*Western Birds* 29:480–481), and future installments in this series might address these points more fully.

I was curious as to why two species, the Gray (*L. modestus*) and Band-tailed (*L. belcheri*) gulls, were not even mentioned in the video. Because both are so rare on this continent, and because some may question the origin of the individuals that have occurred in North America, I can understand why neither had its own species account. Both pose potential identification problems, however (with the Heermann's and Black-tailed Gull, respectively), and some mention of these potential identification issues should have been made.

Because of the length of the video and the incredible amount of information it contains, even the most experienced "larophile" will have to sift through *The Small Gulls* a little at a time, over and over again. However, this video is not merely a "gull encyclopedia," a reference to be opened only when one has a question concerning a certain plumage or character. Beginning birders will benefit from watching (albeit in small bites) the species accounts, both to gain an appreciation for variability within species and to begin building the knowledge necessary to distinguish them. Producer John Vanderpoel and the writers of both of these gull identification volumes are to be commended for producing that rarest of bird identification materials: something that appeals to the most avid fanatic while bringing the identification of these extremely tricky birds within the grasp of beginning birders. Anyone even remotely interested in gull identification should own both of these videos.

Stephen C. Rottenborn

Owls: A Guide to Owls of the World, by Claus König, Friedhelm Weick, and Jan-Hendrik Becking. 1999. Yale Univ. Press, New Haven, CT. 320 pp., 64 color plates. Hardback $50.00. ISBN 0-300-07920-6.

This latest in the Yale/Pica series (hereafter *Owls*) treats 212 species of owls: 18 of Tytonidae (barn owls) and 194 of Strigidae (typical owls). These figures compare with 16 and 189 species recognized by Bruce (1999) and Marks et al. (1999), respectively, in volume five of the *Handbook of the Birds of the World* (hereafter *HBW5*); these discrepancies reflect taxonomic differences of opinion. The introduction to *Owls*

FIRST RECORD OF AN OLIVE-BACKED PIPIT IN MEXICO

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On 18 October 1996, Pike and Wurster recorded Mexico's first Olive-backed Pipit (*Anthus hodgsoni*) at Cataviña, a large oasis located in the Vizcaíno Desert of central Baja California, approximately 360 km south of the international border. They found the bird as it foraged in a yard on Highway 1 approximately 1 km southeast of Hotel La Pinta, just past the crossing of La Bocana, the larger of Cataviña's two streambeds. Pike quickly identified the bird and with Wurster observed it almost continuously at close range (often 10 m or less) from approximately 1015 to 1230 and intermittently for the next hour. Wurster obtained four photographs, although the images are too small and shaded to be definitive; these have been archived at the San Diego Natural History Museum. Hamilton and Radamaker studied the bird closely for approximately 2 hours during the morning of 19 October. Peter A. Ginsburg and Ronald Saldino searched for the bird unsuccessfully on 21 October. In reporting California's first Olive-backed Pipit Capitolo et al. (2000) discuss the identification and distribution of the two subspecies, note potentially confusing species, and list previous North American and Hawaiian records. Pike's field sketch is reproduced as Figure 1, and the following description represents a synthesis of our field notes.

This was a plump pipit in fresh plumage. Bright greenish-olive tones of the upperparts and wings suggested a juvenile, as adults are typically not as brightly colored in fall; all ages fade to predominantly grayish brown by January (M. T. Heindel

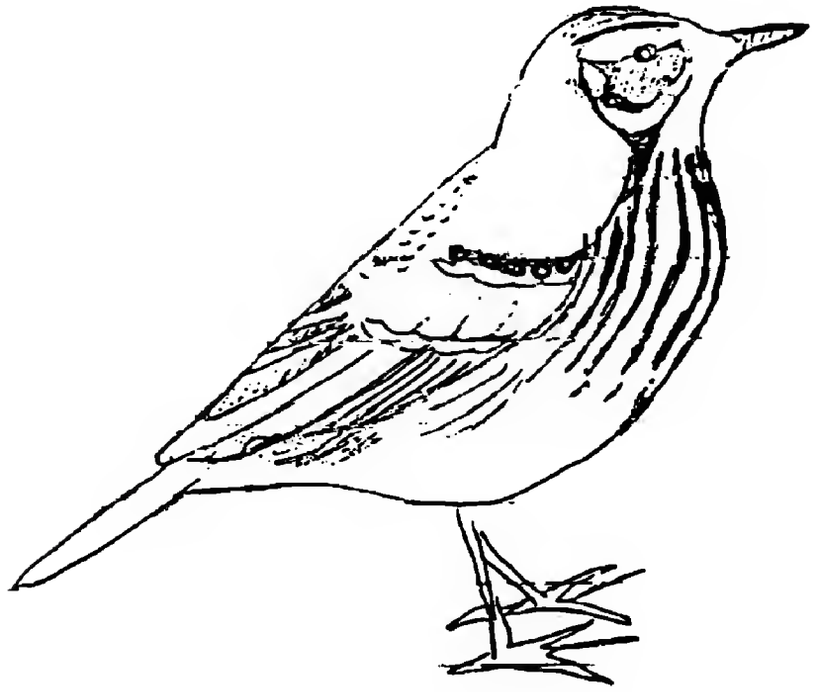

Figure 1. Olive-backed Pipit at Cataviña, Baja California, 18–19 October 1996.

Sketch by James E. Pike

in litt.). Dominance of olive tones over brownish ones across most of the upperparts suggested an individual near the bright extreme for the species (M. T. Heindel in litt.). The legs and feet were bright flesh-pink. The slender bill was perhaps slightly stouter than that of an American Pipit (*A. rubescens*), blackish with dark pink color evident at the base of the lower mandible and flesh-colored along the tomia. The eye was dark.

The prominent supercilium was rich orange-buff from bill to eye, with the posterior portion considered "whitish" by Hamilton, "buffy" by Pike, and "bright yellow-buff" by Wurster; it wrapped slightly around the ear coverts, being somewhat obscured by olive coloration at the level of the eye. This mark is generally interpreted as a light spot at the rear of the ear coverts. A narrow blackish transocular streak was bolder in front of the eye. The ear coverts were dusky to olive with a dark spot at lower rear; viewed at close range, these spots could be seen to protrude slightly from the head like small "horns." Below this was a rich buff submoustachial stripe that merged with the buffy throat across a faint malar streak; this stripe wrapped around the spot at the lower rear of the ear coverts and nearly met the whitish posterior continuation of the supercilium. The malar streak was dusky and almost nonexistent near the bill, but the lowermost portion formed a prominent dark brown triangle.

The crown was greenish olive to olive brown with fine dark streaks extending from the bill to the back of the crown; a bolder dark line formed a border with the supercilium. The nape was unstreaked olive. The mantle was warm greenish olive with dusky "hatch marks" or "scallops" forming faint streaks. Wurster described "tiny, *faint* (diffuse) streaks on lower back," and the rump and upper tail coverts as "uniform brown-olive to gray-olive."

The flight feathers were dark centered and crisply edged in green to greenish yellow—the brightest color evident on the bird. Only one or two primary tips extended past the tertials, which were large and prominent atop the folded wing, dark gray with "green-olive" or "buff" edges. The three innermost feathers of the greater secondary coverts were dark gray with buff edges. The median and outer greater secondary coverts were tipped in pale buff to form two wingbars, the upper being more pronounced. The centers of the median coverts were blackish, creating a row of dots above the upper wingbar.

The weakly notched tail was olive to gray above and white below with a very narrow pale terminal band. White showed in the outer rectrices in flight. In comparison to a typical American Pipit (not present), Hamilton felt that the tail appeared somewhat short relative to body size, while Pike considered the two species to be similar in these dimensions.

The chin, throat, and upper breast were washed with rich buff, while the sides were washed with less intense buff. The breast was heavily streaked with dark brown, somewhat concentrated on the upper breast toward the center. The sides were moderately streaked brown, while the flanks were dusky gray and possibly somewhat streaked. The belly and under tail coverts were white. Relatively long under tail coverts contributed to the large-bodied, short-tailed impression.

A flight note, often given twice during somewhat prolonged flights, was described by Hamilton as an emphatic, buzzy "spee!" that trailed off somewhat at the end. Pike described an alarm note as a drawn-out slightly wheezy "tseeip" comparable to air escaping from a tire, while Hamilton described this note as a thin "seet!" or "speet!" Pike also noted a soft "tsip" note given when the bird was relaxed and feeding.

The pipit mostly walked on open ground, picking carefully around trash and other debris; it seldom stood still while on the ground, proceeding at a steady pace with head bobbing, then running short distances to grab food items, occasionally jumping up to a foot in the air after insects. The tail was held more or less horizontally while walking and bobbed incessantly during brief pauses. The bird periodically flew into Casuarina (*Casuarina* sp.) and Peruvian Pepper (*Schinus molle*) trees, landing as high as 6 m,

and also perched on the thatched roof of a small house; we observed it feeding in these areas.

Identification of this bird to species was straightforward, the similar Tree Pipit (*A. trivialis*) being ruled out by the Cataviña bird's combination of brighter olive-green upperparts with less obvious dark streaking, more prominent bicolored supercilium, and the presence of dark and light spots on the rear ear coverts. The Cataviña bird's unstreaked rump and uppertail coverts, very fine crown streaking, and relatively faint back streaking suggest that it can be assigned to the more expected, more northern subspecies *yunnanensis* rather than the more southern *hodgsoni* (see Capitolo et al. 2000).

Other Siberian/Alaskan vagrant landbirds reported in the western U.S. (south of Alaska) and Baja California in fall 1996 included an Arctic Warbler (*Phylloscopus borealis*) in central California 28 September–1 October (McCaskie 1997, McCaskie and San Miguel 1999), a Northern Wheatear (*Oenanthe oenanthe*) in central California 22–26 September (Roberson et al. 1997, McCaskie and San Miguel 1999) and another in Arizona 29 October 1996 (Benesh and Rosenberg 1997, Rosenberg and Witzeman 1999), a Yellow Wagtail (*Motacilla flava*) in northern California 27 August (Roberson et al. 1997, McCaskie and San Miguel 1999), single Black-backed Wagtails (*M. lugens*) in southern California 27 September–7 October (returning bird, McCaskie 1997, McCaskie and San Miguel 1999), in central California 27–30 September (Roberson et al. 1997, McCaskie and San Miguel 1999), and in Oregon 13 October (Tweit and Gilligan 1997), and five Red-throated Pipits (*Anthus cervinus*) in central California 2–30 October (Roberson et al. 1997) and four more in southern California 18–20 October (McCaskie 1997). The two fall 1996 records of the Olive-backed Pipit in this region, between 26 September (Capitolo et al. 2000) and 19 October, fall within the typical seasonal window of occurrence for most vagrant landbirds that nest in Siberia or Alaska.

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LITERATURE CITED

Benesh, C. D., and Rosenberg, G. H. 1997. The fall migration: Southwest region, Arizona. Natl. Audubon Soc. Field Notes 51:95–98.

Capitolo, P., Richardson, W., Burnett, R., and Pyle, P. 2000. First record of an Olive-backed Pipit in California. W. Birds 31:112–116.

McCaskie, G. 1997. The fall migration: Southern Pacific Coast region. Natl. Audubon Soc. Field Notes 51:118–123.

McCaskie, G., and San Miguel, M. 1999. Report of the California Bird Records Committee: 1996 records. W. Birds 30:57–85.

Roberson, D., Bailey, S. F., and Singer, D. S. 1997. The fall migration: Middle Pacific Coast region. Natl. Audubon Soc. Field Notes 51:114–118.

Rosenberg, G. H., and Witzeman, J. L. 1999. Arizona Bird Committee report, 1974–1996: Part 2 (passerines). W. Birds 30:94–122.

Tweit, B., and Gilligan, J. 1997. The fall migration: Oregon/Washington region. Natl. Audubon Soc. Field Notes 51:108–113.

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WINTER NOCTURNAL ROOST SITES AND BEHAVIOR OF SOME DESERT PASSERINES IN WESTERN TEXAS

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During the nonbreeding season passerine birds may spend more than half their day roosting (Skutch 1989). Nocturnal roost sites are potentially important resources, serving primarily to reduce risk of predation and reduce costs associated with energetic and physiological constraints during inactive periods (Walsberg 1986, Skutch 1989). Vulnerability and low nighttime temperatures during winter are probably strong selective forces in avian life history; a safe roost site increases a bird's chances of survival in the same way that a safe nest site increases chances of fledging. Despite this apparent importance, little is known of intra- and interspecific patterns of passerine roosting behavior.

Climate, restricted roosting habitat, and potential predators mean that suitable winter roost sites are a scarce resource for passerines in the Chihuahuan Desert. Winter temperatures in this habitat average 8.7° C during the coldest month (January) and reach average minimums of 1.4° C (30-year average; NCDN Cooperative Station Data, Panther Junction, 1140 m above sea level, Brewster Co., Texas). Furthermore, strong winter winds in the open desert may also contribute to challenging conditions for roosting birds (see Buttemer et al. 1987), and dense vegetation in the Chihuahuan Desert is generally scarce, confined to arroyos (desert washes) dominated by Honey Mesquite (*Prosopis glandulosa*). Potential nocturnal predators on winter roosting passerines include the Western Screech-Owl (*Otus kennicottii*) and various nocturnal mammals, including the Coyote (*Canis latrans*), Gray Fox (*Urocyon cinereo-argenteus*), and Ringtail (*Bassariscus astutus*).

We describe the winter nocturnal roost sites and pre-roosting (i.e., settlement) behavior of four passerine species in the Chihuahuan Desert of Big Bend National Park, Brewster Co., Texas. From 26 to 29 January 1997, we observed roosting behavior in a thick patch (approximately 25 × 30 m in area) of woody scrub in an arroyo near Croton Spring (29° 20' N, 103° 20' W; 1036 m above sea level). The patch was located adjacent to spring-fed puddles of standing water in an otherwise arid landscape and was composed primarily of Honey Mesquite and Spiny Hackberry (*Celtis pallida*) that formed a leafless canopy 4–5 m tall. Typical Chihuahuan Desert vegetation, which included Creosotebush (*Larrea tridentata*), Lotebush (*Ziziphus obtusifolia*), Mexican Walnut (*Juglans microcarpa*), various cacti (including *Opuntia* spp.) and *Yucca* spp., sagelike bushes (*Leucophyllum* spp.), and bunchgrasses (*Bouteloua*, *Muhlenbergia* spp.), surrounded the patch and adjacent spring.

On four consecutive evenings we crawled through small lanes, created by Collared Peccaries (*Dicotyles tajacu*), in the thick vegetation to reach the interior of the patch 10–20 minutes prior to sunset (about 18:15 CST). Once in the center of the patch, we lay on our backs looking up in order to view the vegetation against the lighter backdrop of the sky. Pre-settlement, settlement, and roosting behaviors, including movements, vocalizations, interactions, self-maintenance, and timing of activities were recorded for all visible birds that could be identified. To minimize disturbance to roosting birds, we used flashlights after observations were complete to confirm identifications and describe roost sites' characteristics. Measurements were estimated with the aid of a metric ruler. Occasionally, roosting birds were flushed during our exit from the roost patch; effects on behavior during subsequent evenings are unknown.

We observed four species roosting within the mesquite–hackberry thicket at Croton Spring: the Cactus Wren (*Campylorhynchus brunneicapillus*), Green-tailed Towhee (*Pipilo chlorurus*), White-crowned Sparrow (*Zonotrichia leucophrys*), and Pyrrhuloxia (*Cardinalis sinuatus*). Except for the Cactus Wren, one or two individuals of each species were observed nightly within a 10-m radius of the center of the patch, with White-crowned Sparrows moving through the area but observed roosting only at the perimeter of the patch. Other common desert species present in the area were not observed roosting in the thicket, although 300–500 White-winged (*Zenaida asiatica*) and Mourning (*Z. macroura*) doves and single Song (*Melospiza melodia*) and Lincoln's (*M. lincolnii*) sparrows were observed settling to roost in a dense, spring-fed reed bed that was approximately 15 × 15 m in area and adjacent to the mesquite–hackberry thicket.

Pyrrhuloxia. Over four evenings we recorded the nocturnal roosting behavior of six individuals, one male, one female, and four of unknown sex. Birds moved into the patch 5–12 minutes before actual settlement, at approximately 25 minutes following sunset. Settlement times ranged from 30 to 36 minutes after sunset, immediately preceding total darkness. Birds appeared to fight over roost sites on two of four nights. During one fight, one bird displaced another from its chosen roost perch and closely chased it 10–15 m, but not out of the patch. One of the birds eventually settled at the original site, while the other moved about in darkness, audibly hitting branches with its wings, and eventually settling 3–5 minutes after all other birds in the area. Birds often called during pre-settlement activity, giving both high-pitched sharp call notes and lower-frequency versions. During aggressive interactions or when roosting birds flushed, Pyrrhuloxias frequently gave rapid series of high-pitched sharp "chip" notes. After settlement, birds rarely called unless flushed. Once settled at a roost site, Pyrrhuloxias fluffed out body feathers and retracted their heads towards their shoulders, so that they resembled a round ball with a protruding tail.

Pyrrhuloxia roost trees included Honey Mesquite (one male, one sex unknown), Spiny Hackberry (one sex unknown), mixed branches of these two species (two sex unknown), and an unidentified plant having willowlike leaves (one female). Roost sites were located at a mean distance of 8.8 m (5.0–13.0 m; $n = 6$) from the edge of the patch. Mean roost height was 2.1 m (1.5–3.0 m; $n = 6$) above the ground, while mean distance below the top of the canopy was 1.2 m (1.0–1.5 m; $n = 6$). Mean diameter of roost perches was 2.4 cm (1.0-3.0 cm; $n = 4$). One roost site was reused on consecutive nights, probably by the same female. During any one night, the nearest distance observed between conspecifics' roost sites was 3.5–4.0 m, which separated a female and an individual of unknown sex. Similarly, the nearest heterospecific roost site was 5.0–6.0 m, between a female Pyrrhuloxia and a Green-tailed Towhee.

Green-tailed Towhee. We observed two to four towhees during each of the four evenings. Settlement occurred 31–37 minutes after sunset, at approximately the same time as Pyrrhuloxia settlement. We did not observe any physical interactions during the 5–12-minute pre-settlement period, while towhees moved through the roost patch low in the vegetation, frequently exchanging "mew" calls. Towhees did not vocalize after settlement or upon flushing after dark. After settlement we located only one individual of unknown sex, which roosted in a dense thicket of thin, leafless mesquite branches, on a branch 5.0 mm in diameter, 1.7 m above the ground, 1.0 m below the top of the canopy, and 7.0 m from edge of the patch. The nearest heterospecific roost site was of a female Pyrrhuloxia 5.0-6.0 m away (see above). We could not locate roost sites of other Green-tailed Towhees within the patch. Towhees presumably left roost sites after first light but well before sunrise; first vocalizations were heard under well-lit conditions, up to 47 minutes prior to sunrise.

White-crowned Sparrow. We observed six to ten sparrows over three evenings. They were observed close to the center of the roost patch prior to settlement, but no roost sites were recorded there. Several roosting birds, however, were flushed after dark from perches 1.5 m high in unidentified shrubs 2.0–2.5 m tall near the patch's edge. Birds gave high-pitched typical alarm calls upon being flushed.

Cactus Wren. One evening, one bird of unknown sex roosted in a Cactus Wren dormitory, entering it 13 minutes after sunset, 22 minutes prior to any other bird's settling to roost. The wren did not vocalize or exhibit other activity prior to or following settlement. The dormitory was located approximately 3.0 m above the ground in mesquite, 1.0 m below the top of the canopy, and 4.0 m from the edge of the patch. Because the dormitory was out of view on other evenings, we do not know whether the wren used the dormitory regularly.

The roost sites of the four species observed differed qualitatively. None of the birds that we observed on roosts were close enough to gain any thermal benefit from each other. Aggressive interactions between Pyrrhuloxias suggest that not all sites within the mesquite–hackberry thicket were suitable roost sites and that good roost sites within the patch may be limiting (see Weatherhead and Hoysak 1984, Skutch 1989). During our visit, high winds and nighttime low temperatures of 0° C suggest that thermoregulatory costs during this period could be high (see also Anderson and Anderson 1957, Buttemer et al. 1987). We observed no mortality or predation, however.

Despite the potential importance of nocturnal roosting behavior in birds, very little information is available for most species (Skutch 1989). Roost sites for three of the species discussed here were previously undescribed (Pyrrhuloxia and Green-tailed Towhee; cf. Austin 1968, Skutch 1989) or incompletely described (White-crowned Sparrow; cf. Chilton et al. 1995); Dobbs et al. (1998) briefly reported the towhee observations discussed here. Cactus Wren roosting behavior is well known (Anderson and Anderson 1957, 1973) and consistent with our observations, although dormitories are typically situated in cholla cacti (*Opuntia* spp.). More detailed study of winter roosting behavior in these species is needed to elucidate the importance of roost sites for wintering birds in the Chihuahuan Desert.

We thank Bob Tweit for insightful discussion regarding the Pyrrhuloxia's winter ecology. Glen Chilton, Mark Sogge, and Ian Warkentin provided helpful comments on the manuscript.

LITERATURE CITED

Anderson, A. H., and Anderson, A. 1957. Life history of the Cactus Wren, part 1: winter and prenesting behavior. Condor 59:274–296.

Anderson, A. H., and Anderson. A. 1973. The Cactus Wren. Univ. of Ariz. Press, Tucson.

Austin, O. L. Jr. (ed.). 1968. Life histories of North American cardinals, grosbeaks, buntings, towhees, finches, sparrows, and allies. U.S. Natl. Mus. Bull. 237.

Buttemer, W. A., Astheimer, L. B., Weathers, W. W., and Hayworth, A. M. 1987. Energy savings attending winter-nest use by Verdins (*Auriparus flaviceps*). Auk 104:531–535.

Chilton, G., Baker, M. C., Barrentine, C. D., and Cunningham, M. A. 1995. White-crowned Sparrow (*Zonotrichia leucophrys*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 183. Acad. Nat. Sci., Philadelphia.

Dobbs, R. C., Martin, P. R., and Martin, T. E. 1998. Green-tailed Towhee (*Pipilo chlorurus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 368. Acad. Nat. Sci., Philadelphia.

Skutch, A. F. 1989. Birds Asleep. Univ. of Tex. Press, Austin.

Walsberg, G. E. 1986. Thermal consequences of roost-site selection: The relative importance of three modes of heat conservation. Auk 103:1–7.

Weatherhead, P. J., and Hoysak, D. J. 1984. Dominance structuring of a Red-winged Blackbird roost. Auk 101:551–555.

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RETARDED WING MOLT IN BLACK-LEGGED KITTIWAKES

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Prebasic molt of the primaries in most species of northern hemisphere gulls occurs between April and December (Dwight 1925, Grant 1986, Cramp and Simmons 1983, pers. obs.). Exceptions are mainly transequatorial migrants, both those that molt primaries after they have reached their southern hemisphere winter grounds (e.g., Sabine's Gull, *Xema sabini*; Grant 1986) and those that suspend primary molt between the summer and winter grounds (e.g., Baltic Lesser Black-backed Gull, *Larus fuscus fuscus*; Jonsson 1998). The complete second prebasic molt of the Black-legged Kittiwake (*Rissa tridactyla*) reportedly occurs from May to November, the adult prebasic molt from June to December (Cramp and Simmons 1983, Baird 1994). During the spring of 1999 we noted adult Black-legged Kittiwakes in central California that had not completed their prebasic primary molt. Here we document and discuss this phenomenon.

On 21 April 1999, off Bodega Head, Sonoma Co., Corben noted a kittiwake that appeared to have an outer primary only partially grown and that showed a large black patch along the leading edge of the underwing, anterior to the black wing tip. We thought little of this until, on 2 May 1999, we examined a kittiwake specimen found freshly dead on Southeast Farallon Island, San Francisco Co., on 11 March 1999. On this bird, primaries 9 and 10 (P9–10) on the right wing were worn and retained and the new P8 was slightly less than full length; on the left wing P10 was retained, P9 missing (presumed shed), and P8 full length. The tertials and outer secondaries had been replaced, while the middle secondaries were retained and worn; the inner two subscapulars (nearest the body) had been replaced, while the outer two were old and worn. Rectrix 5 on each side was old and frayed in contrast to the other tail feathers, which had been replaced. We detected no active molt (i.e., pin feathers) on the head, body, or scapulars. The pattern of the retained feathers on this bird indicated that it was at least in its fourth calendar year (CY4), and the specimen has been deposited at the California Academy of Sciences (CAS 5507).

Subsequent to this discovery we recorded molt data on 33 CY3 and older kittiwakes observed during May 1999: single birds off Bodega Head, Sonoma Co., on 10 and 11 May, one bird in Monterey Bay, Monterey Co., on 15 May, and 30 birds at Pescadero Creek, San Mateo Co. (nine on 15 May, 21 on 17 May). Of these birds, only two were CY3, both of which had full-grown new primaries. None of the remaining 31 birds had full-grown outer primaries: one had P9–10 retained on both wings (and P8 about 85% grown), seven had P10 retained on both wings (P9 65–100% grown), four had P10 retained on one wing and shed on the other wing, and the other birds had P10 growing but not full length. Of the 19 birds with P10 growing, this feather was 90–95% of its full length on nine birds (with P9 full grown) and 40–70% grown on the other ten birds (P9 90–100% grown). The retained outer primaries of five birds studied carefully on 17 May had a pattern typical of a second basic or older (versus juvenal) feather, and thus these individuals were at least in their fourth calendar year.

The head patterns of birds with retarded molt varied considerably, but no bird had the clean white head typical of alternate plumage. All birds with retained primaries had head markings typical of basic plumage (with a dark auricular smudge and a variable dusky wash to the crown and nape). All birds with P10 growing had white heads with scattered dusky gray feathers on the auriculars, hindcrown, and nape: at

long range, a few appeared to have all-white heads. This suggests that those birds with the least retarded primary molt may have been attaining alternate head plumage concurrently with the completion of their prebasic primary molt.

Howell examined winter through spring specimens of kittiwakes at the CAS to determine whether or not the spring 1999 birds were anomalous. Two of 21 CY3 and older birds collected in central California from February to April 1907 exhibit retarded molt: CAS 10873 (18 February) with P8–10 retained on the right wing, P9–10 on the left with P8 shed, and CAS 10822 (13 March) with P10 80% grown. Three of eight CY3 and older birds collected from December 1907 to February 1908 also show ongoing primary molt, although two of these probably would have completed molt in January. The third specimen (CAS 10888, 17 January) has P8–10 retained, P7 5% grown, and P6 full length. An additional specimen (CAS 21944, 22 March 1899) also has retarded molt of the outer primaries: P9–10 retained, P8 85% grown, and P7 full length. All of these late-molting birds appear to be CY4 or older, from the pattern of the primary coverts and retained outer primaries (Grant 1986, pers. obs.), and they constituted 20% (4 out of 20) of the January to April CAS specimens of this age group.

None of the January to March specimens shows suspended molt, i.e., full-grown inner primaries adjacent to retained outer primaries. Rather, they suggest a protracted over-winter molt, with a given primary not shed until the preceding feather is almost or completely full grown. The retarded but relatively synchronized schedules of birds in May 1999, however, suggest that their primary molt may have been suspended earlier in the winter, as has been documented for some species of shorebirds wintering in northern temperate latitudes. For example, adult Black-bellied Plovers (*Pluvialis squatarola*) wintering in northwestern Europe start primary molt in August and September. Birds unable to complete molt before the advent of adverse winter weather suspend molt and retain their outer one to three primaries until the following spring, when they may complete the molt from March to May (Cramp and Simmons 1983).

A combination of factors could be responsible for retarded molt in kittiwakes, ultimately reflecting reduced energy intake. The most direct factor might be a particularly bad storm, or storms, in early winter before birds completed molt. Environmental conditions during preceding seasons might also contribute to a pattern of retarded molt. For example, following particularly stormy winters birds might be weakened and unable to start molt until later than usual. Consequently, they might not complete molt before the next winter. During a strong El Niño, winters of 1996–97 through 1998–99 were unusually stormy in the northeastern Pacific Ocean, and the food supply of many seabirds was reduced through summer 1998, as evidenced by widespread breeding failures of many species (PRBO unpubl. data; pers. obs). A combination of any or all of these factors could have contributed to the retarded molt schedules of the kittiwakes we observed during spring 1999.

In conclusion, at least during some years suspended or very protracted wing molt occurs in a proportion of the adult Black-legged Kittiwakes wintering off California. In some birds, primary molt does not finish until May or June, taking almost a year to complete.

We thank Diana Humple and Mike Lynes for salvaging the Farallon bird, Douglas J. Long for allowing access to specimens at CAS, Debra L. Shearwater for enabling Howell to observe kittiwakes in Monterey Bay, and Peter Pyle, Sophie Webb, and an anonymous reviewer for comments on the manuscript. This is contribution number 913 of Point Reyes Bird Observatory.

LITERATURE CITED

Baird, P. H. 1994. Black-legged Kittiwake (*Rissa tridactyla*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 92. Acad. Nat. Sci., Philadelphia.

Cramp, S., and Simmons, K. E. L. (eds.). 1983. Handbook of the Birds of Europe, the Middle East, and North Africa, vol. 3. Oxford Univ. Press, Oxford, England.

Dwight, J. 1925. The gulls (Laridae) of the world: Their plumages, molts, variations, relationships, and distribution. Bull. Am. Mus. Nat. Hist. 52:63–408.

Grant, P. J. 1986. Gulls: A Guide to Identification. Academic Press, San Diego.

Jonsson, L. 1998. Baltic Lesser Black-backed Gull *Larus fuscus fuscus*—moult, ageing, and identification. Birding World 11:295–317.

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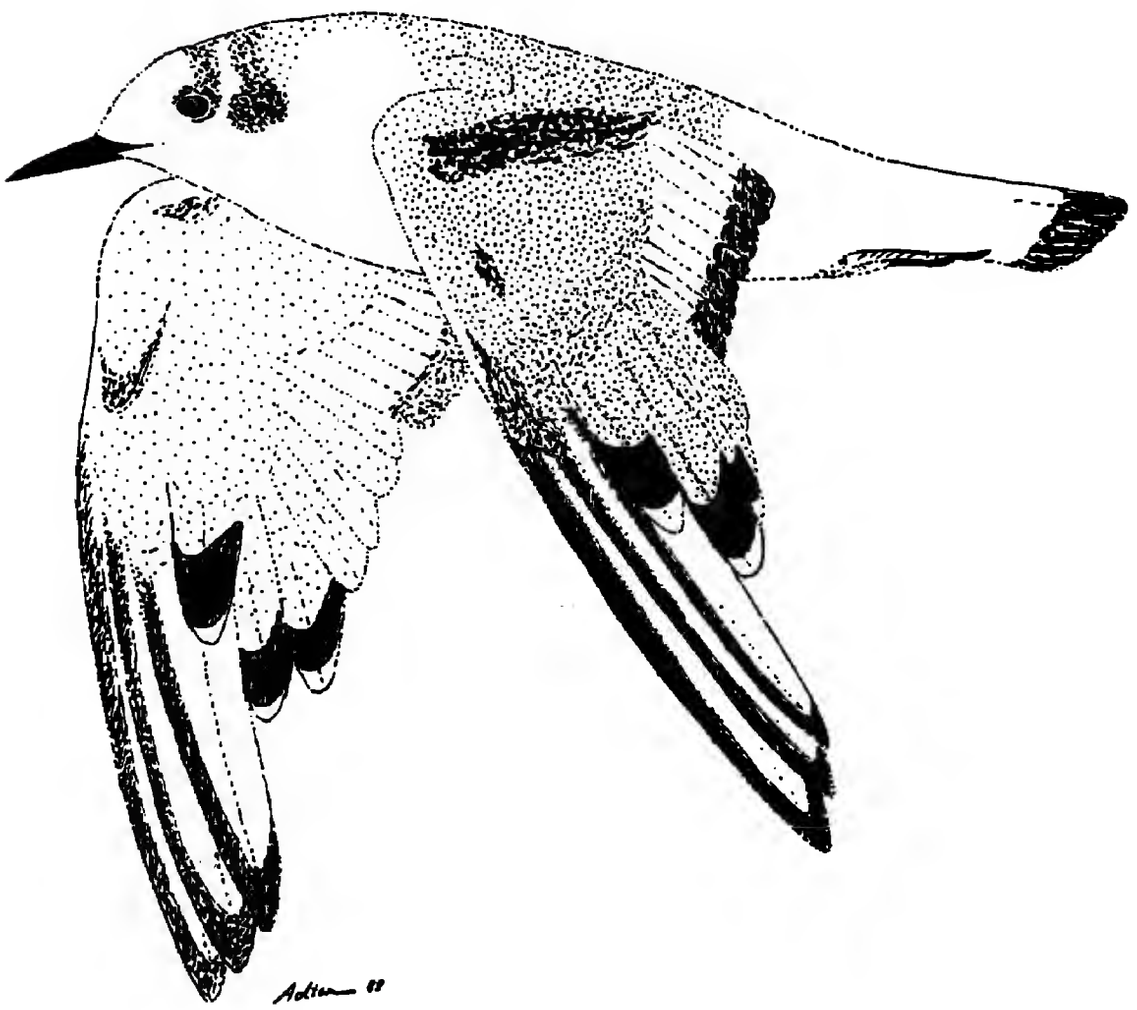

Bonaparte's Gull

Sketch by Sven Achtermann

BOOK REVIEWS

The Small Gulls of North America, with Jon Dunn. 1999. The Advanced Birding Video Series. Peregrine Video Productions. 177 minutes viewing time. VHS stereo. $34.95 plus $6.50 shipping and handling.

Birders have long appreciated the value of a guide or manual that is comprehensive in its discussion of identification and its portrayal of intraspecific plumage variability. The first two offerings of the Advanced Birding Video Series clearly illustrate the advantage of video over print media in achieving these goals, particularly with taxa as variable as gulls. Those impressed with the high quality of *The Large Gulls of North America* will not be disappointed in this follow-up volume covering North America's smaller gull species. In short, *The Small Gulls of North America* has even more of what made volume 1 so useful.

This video provides 177 minutes viewing time covering 14 small and medium-sized gull species. After a brief overview of gull topography, it discusses each species in considerable detail. The duration of this discussion averages about 12.3 minutes per species, with a range of 9.25 for the discussion of the Ross's Gull to an amazing 30.7 for the Mew Gull. Thus the species accounts are significantly longer than those in *The Large Gulls*, which average about 8.7 minutes per species. For each species the general breeding range, wintering range, and patterns of dispersal and migration are described, followed by comprehensive discussions of temporal and spatial occurrence that include a great deal of detail on vagrancy. Information on natural history, habitat associations, and behavior is sprinkled here and there, though this video clearly focuses on identification and intraspecific variability rather than ecology. After brief overview of the general size and shape of each species, the plumages are described in detail, starting with the adult and followed by juvenile, first basic, and subsequent plumages leading to the adult. Video, or at least stills, of nearly all plumages is depicted, and the date and location are indicated for many images.

The narrative is clearly and concisely written, and Dunn's soft narration is easily understood. Occasional references to Dunn's own experience (e.g., the degree of variation in a given plumage or character) not only personalize the video but also give the viewer confidence in the well-researched, up-to-date information presented.

The advantage of video over print media in dealing with tough identification issues lies in its ability to illustrate minute details of plumage and morphology, to show "real-life" shape, behavior, and flight style under different conditions and from a variety of angles, and to depict a wide range of variability within species. This video uses stop-action and slow-motion video, split screens, composite images, and descriptive text and captions even more liberally than in the first volume, where these features were used so effectively. Where differences in the calls of similar species are useful in identification, they are usually played back to back.

Discussion of tough identification issues, such as the separation of the two kittiwakes or of adult Laughing vs. second-alternate Franklin's gulls, is thorough and well supported by appropriate images. One of the strongest points of this video, however, is the attention to detail on intraspecific variability. The inability of most field guides to cover variability within species, owing to space constraints, has always been a source of frustration for me, and I've often wondered whether aberrant individuals or extreme variants of one species may be mistaken for another. Before viewing this video, I made a mental list of unusual features I had seen (e.g., first-year Ring-billed Gulls with nearly all-dark rectrices, a first-year Bonaparte's Gull with extensive dark markings on the upperwing so it resembled a Little Gull, Bonaparte's Gulls with red-based bills) to test how thoroughly variation was described. This video at least mentioned, and usually provided images of, nearly all of the examples I had personally seen. Most of the species treated in this video do not have well-differentiated subspecies, but the detailed account of Mew Gull's racial variation is unparalleled.

For an undertaking this immense and complex, I found surprisingly few points to quibble about. Most of my criticisms concern cases in which the images shown are either at odds with, or are not explained by, the narration or text. For example, narration concerning the extent of black in the wingtips of adult Mew and Ring-billed Gulls accompanies a photo caption stating "white in wingtip," while comparison of "adult and 1st-winter" Black-legged Kittiwakes accompanies photos captioned "adult" and "1st-alternate." On the images of the Kamchatka (*Larus canus kamtschatschensis*) and Common (*L. c. canus*) Mew Gulls presented, I was unable to discern a clear difference in primary pattern, even though the narration stated that the "white wedge that separates the gray bases from the black distal portions of the central primaries" in the Kamchatka is supposedly lacking in the Common. Images of a leucistic Heermann's Gull were not labeled as such and were shown during narration concerning the species' breeding range, while an adult Ring-billed Gull with a dark eye was labeled as such but was not discussed at all in the narration. I applaud the number of images, and the amount of discussion, of unusual variation in this video, but showing such images without explanation may result in confusion for some viewers. In a few cases, attempts to illustrate a narrative point failed visually because the image did not clearly show the character in question. For example, one of the two composite images comparing the relative sizes of the white primary tips of adult Mew and Ring-billed Gulls failed to show the difference described. The addition of date and location to some cuts is very welcome, but I suggest these data be mandatory for all cuts and photos, not simply some. Similar criticisms were pointed out in a review of *The Large Gulls* (*Western Birds* 29:480–481), and future installments in this series might address these points more fully.

I was curious as to why two species, the Gray (*L. modestus*) and Band-tailed (*L. belcheri*) gulls, were not even mentioned in the video. Because both are so rare on this continent, and because some may question the origin of the individuals that have occurred in North America, I can understand why neither had its own species account. Both pose potential identification problems, however (with the Heermann's and Black-tailed Gull, respectively), and some mention of these potential identification issues should have been made.

Because of the length of the video and the incredible amount of information it contains, even the most experienced "larophile" will have to sift through *The Small Gulls* a little at a time, over and over again. However, this video is not merely a "gull encyclopedia," a reference to be opened only when one has a question concerning a certain plumage or character. Beginning birders will benefit from watching (albeit in small bites) the species accounts, both to gain an appreciation for variability within species and to begin building the knowledge necessary to distinguish them. Producer John Vanderpoel and the writers of both of these gull identification volumes are to be commended for producing that rarest of bird identification materials: something that appeals to the most avid fanatic while bringing the identification of these extremely tricky birds within the grasp of beginning birders. Anyone even remotely interested in gull identification should own both of these videos.

Stephen C. Rottenborn

Owls: A Guide to Owls of the World, by Claus König, Friedhelm Weick, and Jan-Hendrik Becking. 1999. Yale Univ. Press, New Haven, CT. 320 pp., 64 color plates. Hardback $50.00. ISBN 0-300-07920-6.

This latest in the Yale/Pica series (hereafter *Owls*) treats 212 species of owls: 18 of Tytonidae (barn owls) and 194 of Strigidae (typical owls). These figures compare with 16 and 189 species recognized by Bruce (1999) and Marks et al. (1999), respectively, in volume five of the *Handbook of the Birds of the World* (hereafter *HBW5*); these discrepancies reflect taxonomic differences of opinion. The introduction to *Owls*

includes short sections on the layout of the book, an overview of owls, and an invited chapter on molecular evolution and systematics by Michael Wink and Petra Heidrich. The color plates (by Weick) show many adult plumages, including subspecies and morphs, and a selection of nestlings and juveniles. Species accounts include headings for identification, vocalizations, distribution, movements, habitat, descriptions, measurements, geographic variation, habits, food, breeding, and status and conservation.

The introductory overview summarizes morphology, behavior, vocalizations, and taxonomy. A glossary would be useful given the number of relatively technical terms used for anatomy and molecular biology. Also, the term "mesoptile" is used on the plate captions for nestlings, although no discussion of plumage development (or molt) is included in the introduction.

The authors note (p. 33) that "owl vocalizations are poorly treated in bird books," but they do not always improve this situation. Most voice descriptions for North and Middle American species appear to have been transcribed from commercial tapes (notably Hardy et al. 1989). The vocal repertoires described are thus somewhat limited, and more detail for some species, such as the Unspotted Saw-whet Owl (*Aegolius ridgwayi*) can be found in regional field guides or on other commercially available tapes (Delaney 1992, Howell and Webb 1995). A few sonograms are used in the introduction, but none is provided in the main text where they would facilitate comparison among problem taxa and similar species.

The invited chapter on systematics presents the results of molecular investigation, apparently without peer review. Nonetheless, I found this chapter a well written and reasonable analysis of genus-level taxonomy, and I appreciated the direct literature citations, which are provided nowhere else in the book. Will the publishers of these family monographs ever include direct citations, or are they and the authors content to compromise the scientific value of their work so seriously? References listed at the end of each species account often appear not to have been used or are miscited; e.g., the range of the Tamaulipas Pygmy-Owl (*Glaucidium sanchezi*) is said to include Veracruz, but whence does this novel information originate?

The acknowledgments laudably credit many scientific institutions but also lead one to conclude that many active field workers in the New World were not involved directly in this project. The authors presumably have field experience in Germany, and apparently in parts of southern South America. Their experience in North and Middle America appears minimal, however, and frequent problems concerning species in these areas are compounded by an inexhaustive literature search. For example, of the *Birds of North America* species accounts, only that for Burrowing Owl (published in 1993) is cited. One would think it useful in an owl monograph to consult prominent references for North American endemics such as those for the Flammulated (1994), Northern Saw-whet (1993), or Spotted (1995) owls.

An example of unfamiliarity with North American geography and literature is the treatment of the "Oaxaca Screech-Owl" (*Otus lambi*) as a full species, apparently on the basis of a comment by Hardy et al. (1989) concerning one case of call playback. The authors of *Owls* seem unaware that *lambi* is generally treated as a race of the Pacific Screech-Owl, *O. cooperi* (e.g., AOU 1998, Binford 1989, Howell and Webb 1995). Instead, they note that *lambi* has been described as a subspecies of *Eastern* Screech-Owl (*O. asio*), and the discussion of similar species does not even mention *cooperi*, despite the mapped range for *lambi* falling completely within that of *cooperi*! In the account for *cooperi*, the only mention of *lambi* is as a similar species distinguished from *cooperi* by its "dark (not barred) crown," a feature not supported by the plate.

The range maps impart a general idea of each species' range but would have benefited from review: e.g., the range attributed to the Cape Pygmy-Owl [*Glaucidium* (*gnoma*) *hoskinsi*] is too generous, the ascription of the Northern Pygmy-Owl [*G.*

(*gnoma*) *californicum*] to northwestern Mexico is unfounded, and no arrow highlights the Juan Fernández Islands on the map for the Short-eared Owl (*Asio flammeus*). Similarly, the movements section supposedly includes "all movements ... including vagrancy," but records of the Stygian Owl (*A. stygius*) from Cozumel Island (Howell and Webb 1995) and south Texas (Wright and Wright 1997) are missing.

Presumably the plates are based upon museum skins, and most species are recognizable, although the paintings are not always accurate; e.g., the pygmy-owls on plate 47 all show too many tail bars. Overall, the plates in *Owls* are disappointing: they are rather washed out (owing in part to the printing?) and fail to convey the subtle beauty and life that make owls so appealing. The illustrations of owls in *HBW5* score much higher in terms of accuracy and aesthetic appeal.

To judge from the other errors I found with ease, it appears that a copy editor was not involved in the production. For example, under geographic variation for the Barn Owl (*Tyto alba*) (p. 195), the Galapagos race *punctatissima* (suggested as perhaps a separate species) is hidden in the account of the Lesser Antillean *insularis*; on p. 25, "Patagonian Pygmy-Owl" is used for *Glaucidium nanum*, an English name used nowhere else I know of, and not even listed by the authors as an alternative name; the Western Screech-Owl subspecies *xantusi* is misspelled *xanthusi*; references listed at the end of the Tamaulipas Pygmy-Owl account include König (1991, 1994) but in the bibliography one finds König (1991a, 1991b, 1994a, 1994b).

A little more time with research and editing, plus the inclusion of direct citations, could have resulted in an important and useful work. Instead, we are left with another Eurocentric and idiosyncratic family monograph that may be as much hindrance as help to North American birders and ornithologists.

LITERATURE CITED

American Ornithologists' Union. 1998. Checklist of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Binford, L. C. 1989. A distributional survey of the birds of the Mexican state of Oaxaca. Ornithol. Monogr. 43.

Bruce, M. D. 1999. Family Tytonidae (barn owls), in Handbook of the Birds of the World, vol. 5 (J. del Hoyo, A. Elliott, and J. Sargatal, eds.), pp. 34–75. Lynx Edicions, Barcelona.

Delaney, D. 1992. Bird Songs of Belize, Guatemala, and Mexico. Cornell Lab. Ornithol., Ithaca, N.Y.

Hardy, J. W., Coffey, B. B. Jr., and Reynard, G. B. 1989. Voices of the New World Owls. ARA Records, Gainesville, FL.

Howell, S. N. G., and Webb, S. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, England.

Marks, J. S., Cannings, R. J., and Mikkola, H. 1999. Family Strigidae (typical owls), in Handbook of the Birds of the World (J. del Hoyo, A. Elliott, and J. Sargatal, J., eds.), pp. 76–242. Lynx Edicions, Barcelona.

Wright, J. S., and Wright, P. C. 1997. Stygian Owl in Texas. Field Notes 51:950–952.

Steve N. G. Howell

FEATURED PHOTO

THE JUVENILE NUTMEG MANNIKIN: IDENTIFICATION OF A LITTLE BROWN BIRD

KIMBALL L. GARRETT, Section of Vertebrates, Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles, California 90007

Naturalized nonnative bird species are generally increasing in diversity and abundance in human-modified habitats of North America (Johnston and Garrett 1994, Garrett 1998a). Some of the more recently established species present field identification challenges because they are unfamiliar to many birders and because they may superficially resemble certain native species (Garrett 1998b). This situation is improving with the recent portrayal of many new naturalized taxa in commonly used field guides (National Geographic Society 1999), but considerable potential for confusion remains.

The Nutmeg Mannikin (*Lonchura punctulata*) is now locally fairly common in various parks, residential areas, and flood control channels and basins in coastal southern California (Smithson 1997, Garrett 1998a); it is especially numerous in the river drainages of Los Angeles and Orange counties. Small populations or isolated escapees have been noted in other parts of the state, particularly the San Francisco Bay area. Adults (sexes are similar) are distinctively patterned and easily identified (Restall 1997, National Geographic Society 1999). Considerable geographical variation has been described within the species' native range in India, southeastern Asia, and Indonesia; populations established in California resemble nominate *punctulata* in having black and white scaled ventral plumage, orange-yellow uppertail coverts, and a black bill (Restall 1997). Birds in juvenal plumage, however, are almost uniformly rich tan in color. These "little brown birds" may bear a superficial resemblance to female or immature male *Passerina* buntings, female Blue Buntings (*Cyanocompsa parellina*) or female White-collared Seedeaters (*Sporophila torqueola*, particularly the more richly colored west Mexican *torqueola* group). This dull juvenal coloration is replaced over about a 6-month period after fledging (Restall 1997), and since breeding may occur for much of the year (Smithson 1997) such plumage may be encountered at almost any time.

Despite their drab, featureless appearance (see back cover photo), juvenile Nutmeg Mannikins can readily be told from native North American emberizids and cardinalids (including actual or potential strays and escapees from Mexico) by several characters. In body size they are smaller than any *Passerina* or *Cyanocompsa* bunting. They are more similar in size to seedeaters but have a shorter, thinner tail. The bill is blackish slate above (more silvery below), often with a small white mark at the gape, and conical in shape; it lacks the strongly curved culmen of *Sporophila* seedeaters. Female and first basic male plumages of the Varied Bunting (*Passerina versicolor*), a potential vagrant to the current California range of the mannikin, are somewhat similar to the juvenile mannikin. Note the bunting's browner bill with a slightly curved culmen and its longer, broader, and darker tail. Indigo Buntings (*P. cyanea*) in brown plumage show some streaking on the underparts (always lacking in mannikins, though wet plumage may appear streaked). Female Blue Buntings, like the mannikins, have a conical, dark bill; again note the bunting's fuller and darker tail, richer overall color, and larger size.

Always look for evidence of basic plumage as the first prebasic molt begins. The individual featured on the back cover shows one obvious black and white scaled feather on the side of the breast and some deep chestnut feathers on the face.

Three behavioral characters should easily clinch mannikin identification. First,

juveniles are usually seen in close association with distinctively plumaged adults. Second, juveniles (as well as adults) give a unique "ki-BEE" call; this call can be surprisingly loud for so small a bird, and it is often ventriloquial. Finally, mannikins fly directly with rapid wingbeats and nearly always form tight, cohesive flocks.

I thank Scott Smithson for filling me in on many aspects of the biology of the Nutmeg Mannikin and for his efforts to document their ecology and population biology in southern California. Specimens at the Natural History Museum of Los Angeles County were used for reference. Robin Restall kindly reviewed a draft of this paper.

LITERATURE CITED

Garrett, K. L. 1998a. Population trends and ecological attributes of introduced parrots, doves and finches in California. Proc. 18th Vertebr. Pest Conf. (R. O. Baker and A. C. Crabb, eds.), pp. 46–54. Univ. Calif, Davis.

Garrett, K. L. 1998b. Field separation of bishops (*Euplectes*) from North American emberizids. W. Birds 29:231–232.

Johnston, R. F., and Garrett, K. L. 1994. Population trends of introduced birds in western North America, in A century of avifaunal change in western North America (J. R. Jehl, Jr., and N. K. Johnson, eds.), pp. 221–231. Studies Avian Biol. 15.

National Geographic Society. 1999. Field Guide to the Birds of North America, 3rd. ed. Natl. Geogr. Soc., Washington.

Restall, R. 1997. Munias and Mannikins. Yale Univ. Press, New Haven, CT.

Smithson, W. S. 1997. Breeding biology and habitat use of the Orange Bishop (*Euplectes franciscanus*) and Nutmeg Mannikin (*Lonchura punctulata*) in southern California: 1997 breeding season report. Calif. Dept. Agriculture, Integrated Pest Control Branch, 6143 Columbus Ave., Riverside, CA 92504.

PRESIDENT'S MESSAGE

For those of you who attended the Western Field Ornithologists' annual meeting in Kernville in July, I don't need to tell you how successful it was and how much all the participants enjoyed themselves. Bob Barnes and his team of volunteers from Kern County really showed us how to organize a meeting that appealed to every one of the 130 or so members who attended. Bob and the Kern crew deserve our unending gratitude. He set a friendly and casual tone at the onset and it continued that way for the entire meeting. In many respects the meeting was more like a large family reunion. I can't remember a better set of papers and presentations during the three afternoon sessions nor could they have been better attended. The evening plenary sessions were equally informative and enjoyable. If there was a theme for the meeting it was to celebrate and focus our attention on riparian and wetland birds, with the Kern River Preserve providing us with the perfect setting. Excellent papers by top-notch ornithologists and citizen scientists on everything from innovative approaches to gull molt to parrots, nuthatches, gnatcatchers, the accumulation of trash in the North Pacific Gyre, to lerp psyllids rounded out the broad and fascinating topics of discussion.

Celebrating our 30th anniversary, especially with Guy McCaskie's presentation at the banquet about our past history, reminded us again of the purpose of Western Field Ornithologists. From its origin 30 years ago as California Field Ornithologists and evolving shortly thereafter to WFO, our roots are deeply planted in the traditions of field ornithology with a solid link and close cooperation with the professional ornithologists who constitute a significant portion of our membership. That formula has worked very well for 30 years and at the directors meeting your board reiterated its commitment to continue with that mission.

For 14 years Phil Unitt has been our outstanding editor, and the ever-improving quality of *Western Birds* is a direct reflection of his commitment and dedication. Our membership currently stands at about 1000 individuals and institutions, and while it reflects a steady growth over the years we hope to increase that number significantly in the near future. A special effort to tap into states not well represented in our membership will be initiated. We also intend to explore possible links with and recruit new members from Mexico and western Canada. I asked everyone attending the meeting to make a commitment to recruit more members to the WFO family, and I extend that request to all members. Thanks to our hard-working treasurer, Dori Myers, WFO is financially sound, but to keep it that way the board moved to increase dues by $2.00 for each membership class and raise life membership from $350 to $400. A regular membership will be $22.00. These changes will not be effective until 2001 or the first issue of volume 32 of *Western Birds*. Given the quality of the journal that is still a bargain. Plans are well under way for the next WFO meeting to be held in Reno, Nevada, 27–30 September 2001. Situated where the Great Basin meets the Sierra Nevada, the Reno/Truckee Meadows area offers birders the chance to explore a rich variety of bird life. From the extraordinary drama of Lake Tahoe to its terminus at Pyramid Lake, the Truckee River reveals dramatic changes of habitat. Nearby Stillwater Wildlife Refuge and the Carson Lake wetlands attract large numbers of shorebirds and waterbirds, while the Sierra Nevada offers a spectacular variety of montane species including the Blue Grouse, Clark's Nutcracker, and Pine Grosbeak. Late September is also an excellent time for unusual birds to occur in that part of Nevada. Early commitments for a broad variety of stimulating topics by some of the best ornithologists in the west promises to highlight another terrific meeting. Even though it's a year away, make your plans now to attend. For more information please contact Lucie Clark at luclark@sierra.net. In the near future also look for more information about Reno 2001 on our website, www.wfo-cbrc.org.

WESTERN BIRDS

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Send membership dues, changes of address, correspondence regarding missing issues, and orders for back issues and special publications to the Treasurer. Make checks payable to Western Field Ornithologists.

Back issues of *Western Birds* within U.S. $24 per volume, $6.00 for single issues, plus $1.00 for postage. Outside the U.S. $30 per volume, $7.50 for single issues.

The California Bird Records Committee of Western Field Ornithologists recently revised its 10-column Field List of California Birds (January 2000). The last list covered 606 accepted species; the new list covers 613 species. Please send orders to WFO, c/o Dori Myers, Treasurer, 6011 Saddletree Lane, Yorba Linda, CA 92886. California addresses please add 7.75% sales tax.

Quantity: 1-9, $1.50 each, includes shipping and handling. 10-39, $1.30 each, add $2.00 for shipping and handling. 40 or more, $1.15 each, add $4.00 for shipping and handling.

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WESTERN BIRDS

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Cover photo by © B. Moose Peterson/WRP of Mammoth Lakes, California: California Gull colony *(Larus californicus)*, Mono Lake, California, May, 1997.

Western Birds solicits papers that are both useful to and understandable by amateur field ornithologists and also contribute significantly to scientific literature. The journal welcomes contributions from both professionals and amateurs. Appropriate topics include distribution, migration, status, identification, geographic variation, conservation, behavior, ecology, population dynamics, habitat requirements, the effects of pollution, and techniques for censusing, sound recording, and photographing birds in the field. Papers of general interest will be considered regardless of their geographic origin, but particularly desired are reports of studies done in or bearing on the Rocky Mountain and Pacific states and provinces, including Alaska and Hawaii, western Texas, northwestern Mexico, and the northeastern Pacific Ocean.

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NESTING POPULATIONS OF CALIFORNIA AND RING-BILLED GULLS IN CALIFORNIA: RECENT SURVEYS AND HISTORICAL STATUS

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ABSTRACT: Statewide surveys from 1994 to 1997 revealed 33,125 to 39,678 breeding pairs of California Gulls and at least 9611 to 12,660 pairs of Ring-billed Gulls in California. Gulls nested at 12 inland sites and in San Francisco Bay. The Mono Lake colony was by far the largest of the California Gull, holding 70% to 80% of the state population, followed by San Francisco Bay with 11% to 14%. Butte Valley Wildlife Area, Clear Lake National Wildlife Refuge, and Honey Lake Wildlife Area were the only other sites that held over 1000 pairs of California Gulls. In most years, Butte Valley, Clear Lake, Big Sage Reservoir, and Honey Lake together held over 98% of the state's breeding Ring-billed Gulls; Goose Lake held 9% in 1997. Much of the historical record of gull colonies consists of estimates too rough for assessment of population trends. Nevertheless, California Gulls, at least, have increased substantially in recent decades, driven largely by trends at Mono Lake and San Francisco Bay (first colonized in 1980). Irregular occupancy of some locations reflects the changing suitability of nesting sites with fluctuating water levels. In 1994, low water at six sites allowed coyotes access to nesting colonies, and resulting predation appeared to reduce nesting success greatly at three sites. Nesting islands secure from predators and human disturbance are nesting gulls' greatest need.

Conover (1983) compiled data suggesting that breeding populations of Ring-billed (*Larus delawarensis*) and California (*Larus californicus*) gulls have increased greatly in the West in recent decades. Detailed assessments of population status and trends of these species in individual western states, however, have been published only for Washington (Conover et al. 1979), Nevada (Yochem et al. 1991), and Utah (Paul et al. 1990). As part of a broad inventory of nongame aquatic birds at Great Basin lakes, Winkler (1982) estimated numbers of these gulls at various colonies in northern California, but his surveys did not cover all historical breeding sites and were conducted late in the breeding season during the extreme drought year of 1977. Currently,

the California Gull is listed as a species of special concern in California (Remsen 1978, Calif. Dept. Fish & Game, unpubl., 1992), and the Ring-billed Gull is under consideration for this designation (L. Comrack pers. comm.).

To determine the current status of breeding California and Ring-billed gulls in California, from 1994 to 1997 we surveyed all sites where they have nested in recent decades. Here we report the distribution, abundance, habitat associations, and nesting phenology of gulls at these colonies, present the historical record, and evaluate data quality and population trends of these species in California. Finally, we assess threats to these colonies and make recommendations for their protection.

STUDY AREA AND METHODS

Statewide Surveys

We surveyed gull colonies statewide from 1994 to 1997, focusing our efforts on the Modoc Plateau and Great Basin in northeastern California, where most historical colonies have been located. This region, though arid, has numerous large wetlands at moderately high elevations in plateaus, large valleys, or basins receiving drainage from nearby mountains. Colonies at Mono Lake in the Great Basin, at San Francisco Bay on the coast, and at the Salton Sea in the Colorado Desert of southern California were surveyed as part of other studies, as described below. We supplemented the statewide surveys with data from opportunistic surveys or other studies from 1998 to 2000. Prior to our field surveys, we searched the literature and contacted biologists and field ornithologists active in California to determine which sites had supported gull colonies since the 1970s. Shuford also scouted for other gull colonies during shorebird surveys by airplane, airboat, and on foot in northeastern California in late April to early May in 1994 and 1995 and during statewide surveys on foot, by kayak, and by plane for various colonial waterbirds from mid-May to mid-July, 1997 to 1999 (Shuford 1998, Shuford et al. 1999; PRBO unpubl. data).

Our surveys spanned one very dry year and three very wet years. The survey period began at the end of a drought that began in 1986–87 and ended in 1994–95, interrupted only by above-normal precipitation in 1992–93. Precipitation (1 July–30 June) in the Great Basin in California averaged 31.8, 93.6, 69.8, and 79.7 cm in 1993–94, 1994–95, 1995–96, and 1996–97, respectively; the long-term average (n = 103 years) for this region is 54.0 cm (Western Regional Climate Center; http://www.wrcc.dri.edu/divisional.html). Water levels at most colonies in northeastern California fluctuated greatly over the survey period.

To capture peak nesting numbers, we selected a primary survey period of early to mid-May for San Francisco Bay and mid- to late May for northeastern California, representing the late incubation to very early hatching period of both species (PRBO and SFBBO unpubl. data). Shuford and colleagues counted all gull nests or breeding adults at various colonies in northeastern California primarily from 11 to 29 May, 1994 to 2000. A few early-season surveys (27 April–3 May) served mainly to confirm the lack of nesting at a few sites occupied irregularly. Shuford also counted nesting gulls at Goose Lake in mid-June 1999 and 2000; gull nesting at Goose Lake in these years was

much later than at other sites in the region. Dates of nest counts at Mono Lake in all other years, 1983 to 1993, ranged from 18 May to 2 June, except in 1983 when they spanned 29 May to 16 June (PRBO unpubl. data, J. R. Jehl, Jr., in litt.). Shuford and others conducted aerial photographic surveys of nesting gulls at the otherwise inaccessible Sheepy Lake pelican and cormorant colony at Lower Klamath National Wildlife Refuge (NWR) on 23 May 1994, 12 May 1997, and 13 May 1999. Gulls may have nested at this site in other years of our surveys, but a lack of counts at this small colony has little effect on statewide totals. Similarly, we were unaware until 1995 that in 1994 a few gulls bred at Shasta Valley Wildlife Area (WA), Siskiyou County; no gulls bred at this location in subsequent years (M. McVey pers. comm.).

From 3 May to 19 June (mostly 8–20 May), 1994 to 2000, Ryan, V. L. Layne, D. Bell, and colleagues surveyed California Gull colonies in San Francisco Bay within Santa Clara, Alameda, San Francisco, and Contra Costa counties. Nest counts there from 1980 to 1993 were between 4 May and 21 June (mostly 4–30 May; SFBBO unpubl. data). Molina (2000) counted California Gull nests at a newly formed colony at Obsidian Butte, Salton Sea, Imperial County, between 15 May and 6 June, 1997 to 1999.

Observers made most counts by walking through colonies and marking each nest individually (on the rim or on an adjacent rock or weed) with a dab of spray paint to avoid over- or undercounting. For those colonies, we estimated the number of nesting pairs equaled the number of nests counted. At South San Francisco Bay we did not mark nests; the colonies' occupying narrow dikes minimized over- or undercounting. An exception was at the Alameda Naval Air Station (NAS), where colony size was estimated from outside the colony (L. Collins pers. comm.).

At Clear Lake, most years we used the spray-paint method to count one or two gull colonies not inhabited by other colonial waterbirds. Otherwise, observers minimized disturbance to multi-species colonies by counting all adult gulls from a small motorboat cruising slowing by the colonies about 60 m offshore. We estimated the number of nests on these islands as 0.71 of the number of adults counted for the Ring-billed and 0.72 for the California, the ratios at Clear Lake in 1994 at colonies where we could count both nests and adults. Though these ratios may vary by site and year, we applied them at Sheepy Lake to counts of adults obtained from aerial photographs in 1997 and at Goose Lake to counts of adults from the ground in 1999 and 2000, when the association of gulls with nesting Caspian Terns (*Sterna caspia*) precluded nest counts. We made all counts in the morning at the same stage of the nesting cycle. At Lake Shastina in 1994, R. Ekstrom (in litt.) counted nesting gulls from shore by looking out to the small nesting island off Milkhouse Island; in other years, observers counted nests using the spray-paint method.

For northeastern California, we characterized nesting phenology by the first observations of chicks and, to a lesser degree, by the proportion of nests with chicks at the time of our surveys. Survey dates and the extent of coverage were most suitable for this purpose in 1994, 1995, and 1997. We estimated the approximate dates of first egg laying by backdating based on the range of mean incubation periods from various studies reported by Ryder (1993; 25–26 days) for the Ring-billed Gull and Winkler (1996; 24–

27 days) for the California. In San Francisco Bay in 1998 and 1999, biologists aged eggs by the egg flotation method of Hays and LeCroy (1971) and thereby estimated egg laying dates ±1–2 days.

Historical Data

We obtained other population estimates from the published literature when possible, including the seasonal reports of *North American Birds* (NAB) and its predecessors, and unpublished sources, including long-term studies at Mono Lake (PRBO; J. R. Jehl, Jr., in litt.) and San Francisco Bay (SFBBO), the notebooks on file with the regional editors of the Middle Pacific Coast Region of NAB (cited MPCR notebooks), the files and annual narrative reports of various state and federal wildlife refuges, and biologists' field notes. We report dates of surveys, methods used, and the numbers of nests or pairs when these data are available. Otherwise, we report numbers of nesting adults, as there is no reliable way to convert raw counts or estimates of adults to nesting pairs. We also searched for historical data from the records of egg sets housed at the California Academy of Sciences (CAS), Museum of Natural History of Los Angeles County (LACM), Museum of Vertebrate Zoology (MVZ), San Bernardino County Museum (SBCM), San Diego Natural History Museum (SDNHM), Santa Barbara Museum of Natural History (SBMNH), and the Western Foundation of Vertebrate Zoology (WFVZ).

Data Quality

Because the methods used to estimate nests, adults, or young varied widely, we categorized the accuracy and repeatability of each estimate as high (1), moderate (2), or unknown (3). 1: All counts taken near the late incubation period when the adult nesting population reaches its peak; individual nests counted in entire colony, or density of nests in a portion of a colony calculated then applied to the measured area occupied by the entire colony, or number of pairs estimated from counts of adults converted to nesting pairs from the ratio of adults to nests determined for a portion of the colony. We consider such data appropriate for population-trend assessment. 2: Counts taken on known date(s) in early to mid-nesting season and based on direct counts or estimates of adults or chicks, possibly from a distant vantage point. Such data should be viewed cautiously in assessment of population trends. 3: Date(s) and/or methods of surveys unavailable, or methods as in category 2 but estimate made late in the nesting season, or estimate made visually from fixed-wing aircraft. Such data should be used with great caution in interpreting population trends. The quality of estimates based on early- to mid-season aerial photographs varies with the clarity and size of images and contrast of adult gulls and nests with the background.

RESULTS AND DISCUSSION

Current Distribution, Abundance, and Habitat Associations

Except for the recently established colonies of California Gulls in San Francisco Bay (Jones 1986) and at the Salton Sea (Molina 2000), all known current breeding colonies of California and Ring-billed gulls in California are located in the northeastern part of the state in Siskiyou, Modoc, Lassen,

Plumas, and Mono counties (Figure 1). For California Gulls, the westernmost and southernmost breeding sites in the species' entire range are at San Francisco Bay and the Salton Sea, respectively (Winkler 1996, this paper), whereas Ring-billed Gulls reach their southwestern limit at Honey Lake (AOU 1998).

In northeastern California, gulls nest mainly on islands and, rarely, on peninsulas at natural lakes, reservoirs, managed wetlands, and saline or alkaline lakes, primarily between 2700 and 5100 feet (823–1555 m) above sea level, at 6385 feet (1947 m) at Mono Lake. The substrate may be earth, rock, or, infrequently, broken-down tule mats. Gulls nest in the open or among rocks, tall weeds, or shrubs (Figures 2b, 3b, 4b, 5). California and Ring-billed gulls often nest together at these sites and/or with other colonial species, such as pelicans, cormorants, herons, egrets, and terns. Except at

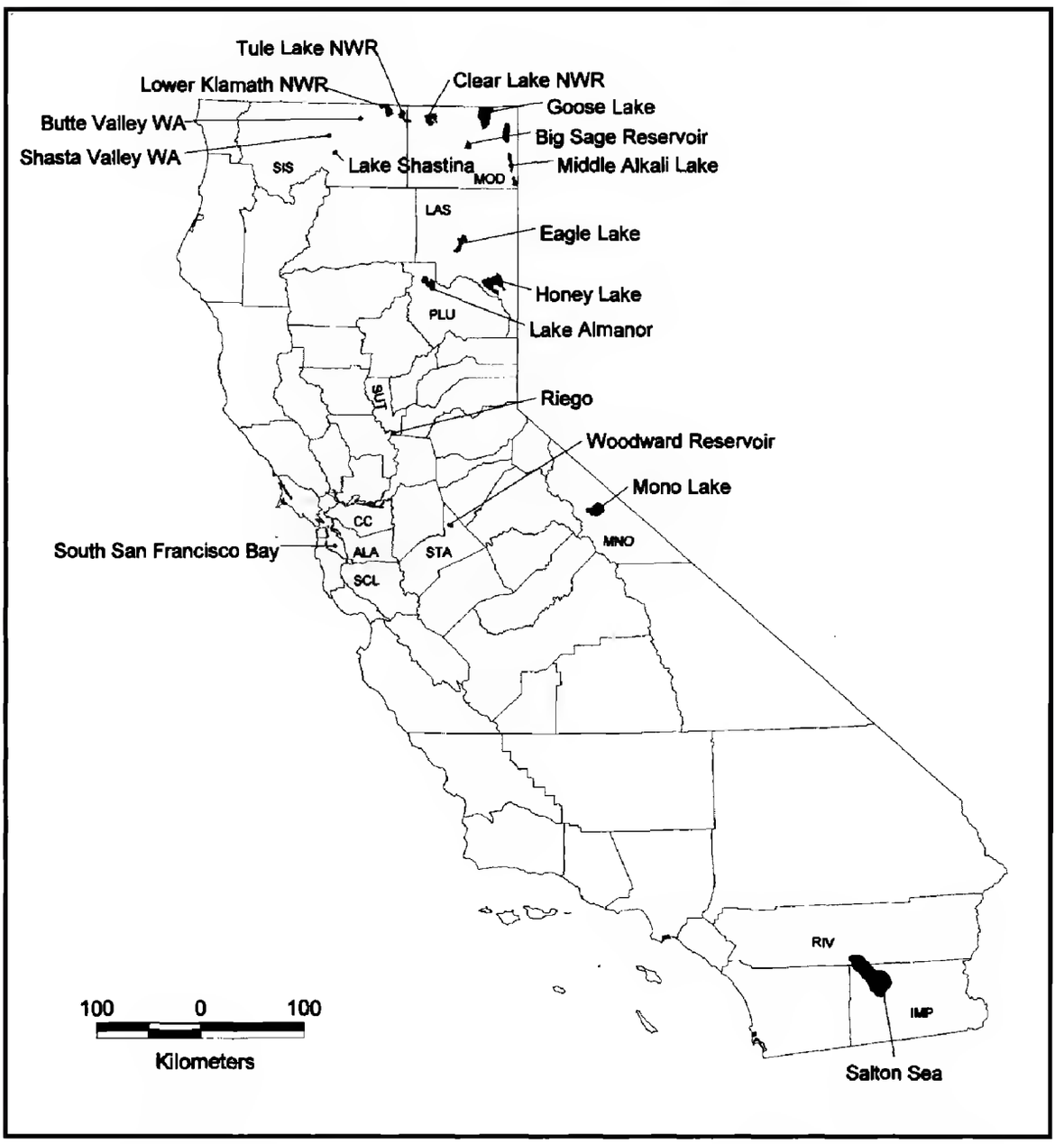

Figure 1. Locations of California and Ring-billed gull colonies in California. All colonies have been active since 1944 except for Riego, Sutter County, and Woodward Reservoir, Stanislaus County.

Mono Lake, most large gull colonies are at or near extensive freshwater wetlands or irrigated fields (primarily alfalfa). In San Francisco Bay, California Gulls nest at sea level primarily on earthen islands and levees in salt ponds; the small colony at the Salton Sea, on a rocky and sandy island near shore, is 227 feet *below* sea level.

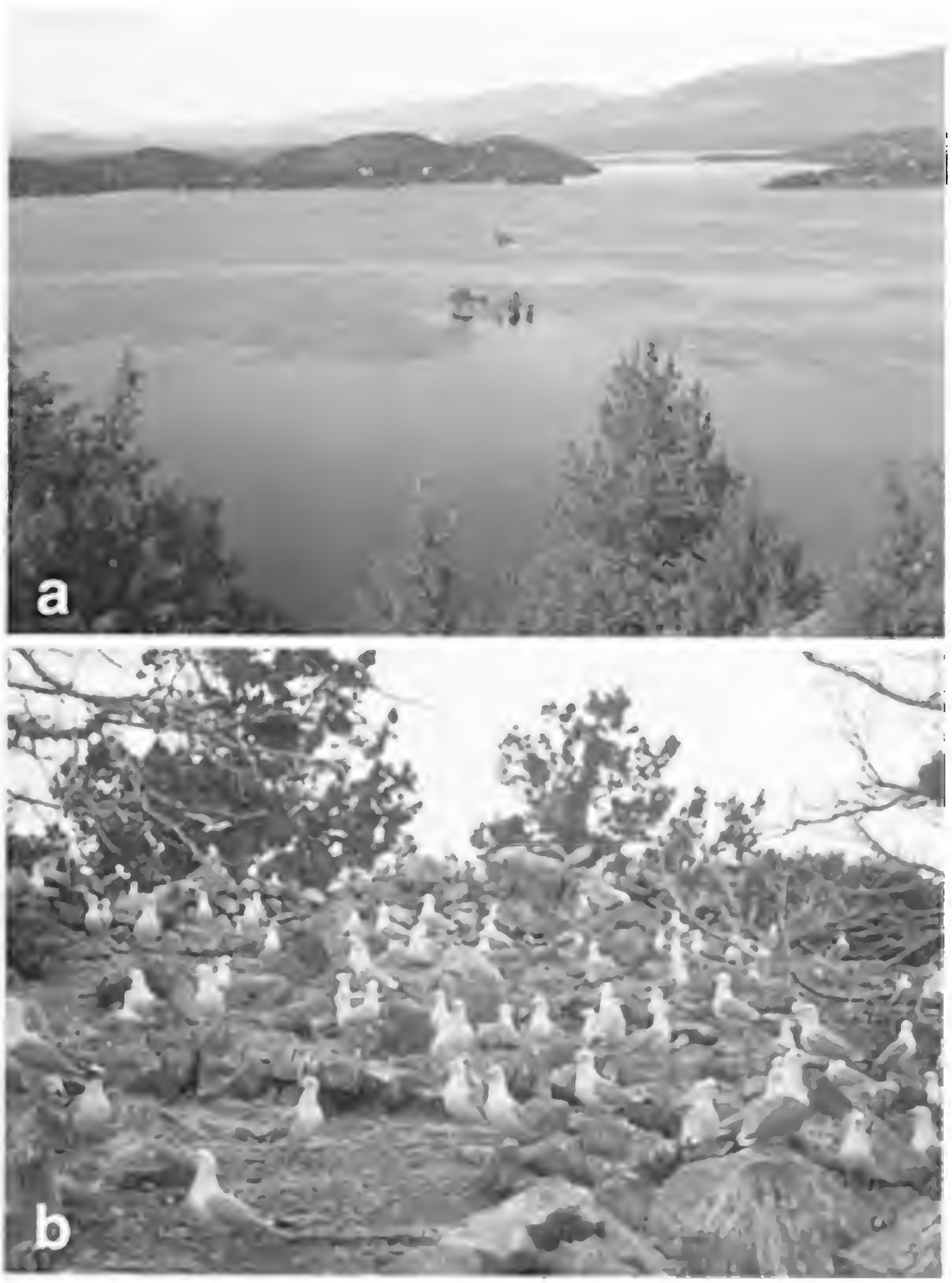

Figure 2. (a) View from landlocked Milkhouse Island of islet in central portion of Lake Shastina, Siskiyou County, where (b) Ring-billed and California gulls nest amid rocks and shrubs.

Photos by W. D. Shuford, 16 May 1995

Figure 3. (a) Aerial view of Meiss Lake, Butte Valley Wildlife Area, Siskiyou County, where Ring-billed and California gulls attempted to nest during a prolonged drought despite the nesting islands' becoming peninsulas. (b) Ring-billed Gulls nesting amid weedy growth on an island in Meiss Lake, with Mt. Shasta looming in the background, five years later after water levels had risen.

Photos by W. D. Shuford, (a) 23 May 1994 and (b) 24 June 1999

Figure 4. (a) View from bluff along Highway 395 of southeastern portion of Goose Lake, Modoc County, where small changes in lake level can rapidly expose or inundate potential nesting islands. (b) Ring-billed Gull colony on a low-lying grassy island isolated after a post-drought rise in the level of Goose Lake.

Photos by W. D. Shuford, 18–19 May 1997

Figure 5. California Gulls nesting in the grass in the open and under shrubs on a small islet in Middle Alkali Lake, Surprise Valley, Modoc County, with the Warner Mountains in the distance.

Photos by W. D. Shuford, 17 May 1994

California Gull. From 1994 to 1997, the number of pairs of California Gulls nesting in the state ranged from about 33,125 to 39,678 (Table 1). In these years, the Mono Lake colony constituted 70% to 80% of the statewide total, colonies farther north 9% to 16%, and the San Francisco Bay colonies 11% to 14%. Of other sites occupied as recently as the early 1990s, only Tule Lake NWR and Lake Almanor remained unoccupied throughout the four years of our surveys.

Ring-billed Gull. From 1994 to 1997, at least 9611 to 12,660 pairs of Ring-billed Gulls nested annually at five to seven sites in northeastern California (Table 1). Of other sites occupied since the 1970s, only Tule Lake NWR remained unoccupied throughout our surveys. Despite their smaller statewide breeding population, Ring-billed Gulls outnumbered California Gulls where they overlapped in Siskiyou, Modoc, and Lassen counties by a ratio of about 1.9 to 3.2:1, a pattern Winkler (1982) also found.

Phenology

In all years, we saw at least a few small chicks during our nest counts, indicating we had timed our counts well with respect to peak nesting numbers. Patterns varied somewhat by species, region, and year.

California Gull. In northeastern California, we recorded the first California Gull chicks from 16 to 20 May, with no consistent pattern of variation by colony or year. Backdating, the earliest California Gull eggs were laid at least

Table 1 Numbers of Nesting Pairs of Ring-billed and California Gulls in California, 1994–1997[a]

	Ring-billed				California[b]			
Site	1994	1995	1996	1997	1994	1995	1996	1997
Lake Shastina[c]	~15	73	~50	221	~300	151	~103	123
Shasta Valley WA	~15	0	0	0	0	0	0	0
Butte Valley WA[d]	3190	3158	4087	3475	327[e]	1803	1873	2145
Lower Klamath NWR[f]	178	—	—	79	312	52	87	104
Clear Lake NWR[g]	2868	2942	3747	3680	1175	1769	1488	1355
Goose Lake	0	0	0	1117	0	0	0	73
Big Sage Reservoir	3007	2052	—[h]	1586	76	11	—[h]	28
Middle Alkali Lake	0	0	0	0	71	0	0	0
Eagle Lake	0	132	0	0	0	201	0	0
Honey Lake WA[i]	1931	1961	1727	2502	1247	1317	1510	1913
Mono Lake	0	0	0	0	31,670	24,927	23,750	24,957
Salton Sea	0	0	0	0	0	0	2	22
San Francisco Bay	0	0	0	0	4500	4357	4312	5076
Totals	11,204	10,318	(9,611)[j]	12,660	39,678	34,588	33,125	35,796

[a]Data from direct nest counts or other methods meeting category 1 quality standards (see Methods). —, No survey made; 0, survey taken but no nesting gulls found.

[b]We found no nesting gulls at Lake Almanor, where they previously bred at least sporadically, or at Tule Lake in 1994 and 1997, and it is unlikely that they nested there in 1995 and 1996.

[c]In 1994, counts taken from shore by spotting scope; in 1996, count of total nests made on island but apportioned to species by ratio found in 1995.

[d]Observers (K. Novick in litt.) counted 2298 and 2956 pairs of California and 3484 and 2525 pairs of Ring-billed gulls nesting at Meiss Lake in 1998 and 1999, respectively.

[e]Count low as many nests already destroyed by coyotes when colony censused on 11 May (J. King in litt.).

[f]Aerial photographs taken in 1994 and 1997 of the pelican and cormorant colony at Sheepy Lake showed about 178 and 79 pairs of Ring-billed Gulls and 43 and 8 pairs of California Gulls, respectively. In 1999, high water saturated the island and no gulls nested. This small colony has been active since at least the early 1990s (L. A. Moreno-Matiella pers. comm.), hence the gull numbers we attribute to Lower Klamath probably were slightly underestimated in 1995 and 1996. In 2000 J. Beckstrand (in litt.) estimated 48 pairs of the Ring-billed and 6 of the California at Unit 6A.

[g]Biologists erected an electric fence across a peninsula to Bird Island in late May 1994 to prevent access by coyotes. J. Beckstrand (in litt.) found 1345, 1245, and 432 pairs of the California and 3922, 1957, and 1739 pairs of the Ring-billed nesting in 1998, 1999, and 2000, respectively.

[h]No surveys made, but gulls were thought to be nesting.

[i]On 17 and 18 May 2000 B. Tatman (pers. comm.) counted 1794 nests of California and 1964 nests of Ring-billed gulls at Honey Lake WA; all were at Hartson Reservoir except 544 of the Ring-billed on islands in Unit 5A.

[j]The total for the Ring-billed in 1996 is probably low by at least 1500 to 2000 pairs because Big Sage Reservoir was not surveyed.

by 19-22 April in 1996 and 1997 but probably several days earlier based on the large numbers of early-season chicks in those years. On 16 May 1997, 22.2% of 1858 California Gull nests checked at Honey Lake had small chicks, implying the earliest nesting; no chicks were seen at any other colonies surveyed from 14 to 19 May 1997. On 17 May 1995, of 47 territorial gulls an island in Clear Lake had only 7 nests with eggs, implying the latest nesting.

Estimated mean dates of egg laying in San Francisco Bay in 1998 and 1999 ranged from 26 April (range 18 April–2 May, SD 2.67, n = 121, colony surveyed 3 May) at Knapp to 8 May (range 5–14 May, SD 2.39, n = 100, colony surveyed 14 May) at Moffett, both in 1998.

Ring-billed Gull. We saw the first Ring-billed Gull chicks from 16 to 20 May, in all instances at Honey Lake. Backdating implies the earliest eggs were laid about 20–21 April in 1994 and 1997. Nesting was somewhat advanced at Honey Lake in 1997, when on 16 May 3.1% of 2479 Ring-billed Gull nests checked had small chicks; no chicks were seen at any other colonies surveyed from 14 to 19 May 1997. In 1999, incubating adults and a lack of chicks at Goose Lake on 20 June indicated a very late initiation of nesting.

History of Breeding Colonies

Lake Shastina. It is unclear when islands became available or when gulls began nesting at this reservoir, which though created in 1928 took a long time to seal and hold water (DWR 1988, R. Ekstrom pers. comm.). Our counts of a mixed colony of Ring-billed and California gulls nesting among rocks and shrubs on a small island off landlocked Milkhouse Island (Table 1, Figure 2) appear to be the only population estimates for this site.

Shasta Valley WA. The only known evidence of gull nesting was in 1994 when low water at Steamboat Lake exposed two small dredge-spoil islands that later in the season became a peninsula. The attempts by a few Ring-billed Gulls to nest there apparently were disrupted by terrestrial predators (B. Smith pers. comm., Table 1).

Butte Valley WA. Historically, Meiss Lake covered about 4050 ha, but diking in the 1940s greatly reduced the size of the wetlands (K. Novick pers. comm.). The islands where gulls nest have been available since before the dikes; smaller islands created in managed wetlands since the establishment of the refuge in 1981 have not been used. Gulls have nested at Meiss Lake since at least 1970, when a 27 May survey of only one of the lake's islands revealed 1244 nesting gulls (species not distinguished; K. Novick in litt.). Aerial surveys of Meiss Lake from 1 to 5 June 1981 and 29 May to 1 June 1984 yielded estimates of about 1000 and 700 nesting gulls, respectively (B. E. Deuel in litt.). On 7 May 1988, observers estimated 600 to 1000 adult gulls on three of the four islands with nesting gulls that they checked; they did not estimate the proportions of the two species, but Ring-billeds were more numerous than Californias (K. Novick in litt.). In 1988, a landbridge formed, leaving the colony vulnerable to predation; in 1992, the lake dried up, and gulls did not nest successfully.

The first accurate nest counts at Meiss Lake on 7 May 1993 yielded 520 pairs of California and 450 pairs of Ring-billed gulls nesting on four low-lying

islands (K. Novick in litt.). The early-season counts in both 1988 and 1993 may have underestimated the nesting population in those years. In 1994, both species initiated nesting on two peninsulas in the lake (Table 1, Figure 3a). Signs of coyote (*Canis latrans*) predation starting in May and the lake's drying by early July made it unlikely that gulls raised any young in 1994 (K. Novick pers. comm.). From 1995 to 1999, gulls nested on up to seven small islands in Meiss Lake, three or four in the central portion and one to three in the south portion of the lake (K. Novick in litt., Figure 3b). During this period, the nesting Ring-billed Gull population ranged from about 2525 to 4087 pairs with no trend (Table 1, K. Novick in litt.). By contrast, California Gull numbers increased steadily from about 327 pairs in 1994 to 2956 in 1999 (Table 1, K. Novick in litt.), although this trend is exaggerated by the artificially low count in 1994.

Lower Klamath NWR. Before 1900, Lower Klamath Lake consisted of about 22,267 ha of marsh and 12,146 ha of open water (Akins 1970). Currently, Lower Klamath NWR has 8907 ha of wetlands; 4858 to 6478 ha are seasonally flooded and 2024 to 3644 ha are permanently flooded marshes (USBR 1998). In 1905, Finley (1907) explored Lower Klamath Lake by rowboat, describing floating tule "islands" stretching for miles separated by a network of narrow channels. He and his companion, H. T. Bohlman, found "at least 500 pairs" of California and Ring-billed gulls nesting on the broken-down tules. They ascribed the nesting sites to Lower Klamath Lake, Oregon, but given the vast area of the lake and the difficulty of travel they could have missed other sites.

Since 1952, biologists at the Klamath Basin National Wildlife Refuges have estimated numbers of breeding gulls at Lower Klamath NWR, California (Table 2). From the 1950s to the 1970s, up to 2500 pairs each of the California and Ring-billed gulls nested. The refuge estimated 700 Ring-billed Gull nests in 1976, but subsequently very few appear to have nested at Lower Klamath. When thousands of California Gulls were nesting there in the 1980s, M. Robbins (pers. comm.) noted only one or two Ring-billed Gull nests, in 1981 and 1983.

Spraying of oil on gull eggs by biologists in the 1950s, to reduce gull predation on waterfowl eggs and young (J. Hainline pers. comm.), did not appear to have any major effect on gull populations on the refuge. Probably beginning in the 1950s or 1960s, and increasing from the 1970s to early 1980s, refuge personnel built islands in diked ponds to attract nesting Canada Geese (*Branta canadensis*; J. Beckstrand in litt.). Gull colonies expanded to occupy islands as they became available and first concentrated in Unit 4 of the refuge (early 1960s), then units 3 and 4 (mid-1960s), finally units 4 and 6 (late 1970s onward). The gulls' apparent increase from the late 1970s to the mid-1980s, peaking at 3000–5000 pairs of the California in 1985, prompted removal of most of the islands to reduce the perceived problem of gull predation on waterfowl nests and young (J. Hainline, D. Mauser pers. comm.). Draining of ponds in Unit 4 for maintenance in late April 1986 forced thousands of gulls to abandon nesting islands by 1 June, and they produced no young (R. Ekstrom, M. Robbins in litt.). In 1987 and 1988, numbers of gulls declined (refuge's annual reports). In 1989, after removal of islands in Unit 4C displaced over 2000 nesting gulls, biologists found only a

Table 2 Numbers of Nests (and Young) of California and Ring-billed Gulls at Lower Klamath National Wildlife Refuge, 1952–1991

Year	California	Ring-billed	Unidentified
1952[a]	1820 (3600)	2400 (5500)	
1953[a]	930 (1580)	46 (80)	
1954[a]	? (3025)	? (1810)	
1955[a]	1533 (2759)	746 (1720)	
1957[a]	1220 (1220)	900 (900)	
1958[a]	800 (1000)	500 (600)	
1961[a]	? (500)	? (400)	
1963[a]			900 (2000)
1964[a]	2500	400	
1965[a]			1514 (2000)
1966[a]			2000 (2500)
1967[a]		2500 (2000)	
1968[a]	1300 (1500)	800 (1000)	
1969[a]	900 (1300)	600 (850)	
1970[a]	548 (700)	950 (1200)	
1971[a]	1550 (620)	700 (350)	
1972[a]	1670 (508)	685 (322)	
1972[a,b]			? (3000)
1973[a]	? (600)	? (580)	
1976[a]	210 (400)	700 (955)	
1977[c]			present
1980[d]	4000 adults		
1985[e]	3000–5000		~2000 adults
1986[a,f]	1000's (0)		
1990[a]			~100
1991[a]			~100

[a]Data quality category 3, from refuge's annual narrative reports.

[b]From *Am. Birds* 26:884.

[c]Gulls nested successfully on islands in a dry lakebed (E. O'Neill *fide* D. W. Winkler in litt.).

[d]A visit on 1 June produced a rough estimate of 2000 pairs (data quality category 2; Conover 1983, S. A. Laymon pers. comm.).

[e]Based on visits from mid-June through mid-July (data quality category 2; R. Ekstrom in litt. and annual narrative reports).

[f]From R. Ekstrom (in litt.).

few gull nests on the entire refuge. Since then the few breeding gulls have nested in Unit 6A or in Sheepy Lake (Table 1; J. Beckstrand pers. comm., Shuford pers. obs.). Sheepy Lake has been occupied by nesting gulls since at least the early 1990s (L. A. Moreno-Matiella pers. comm.), but its remoteness may have masked earlier occupation.

From 1994 to 2000, numbers of nesting pairs of California Gulls ranged from about 6 to 269 in Unit 6A of Lower Klamath NWR, where they bred on up to 8 small rocky islets (Table 1). During that period, Ring-billed Gulls

nested in Unit 6A only in 2000, but in 1994 and 1997, at least, small numbers nested with even fewer California Gulls on a tule-mat island at Sheepy Lake (Table 1).

Tule Lake NWR. Before 1900, Tule Lake fluctuated in size from about 22,267 to 44,534 ha (Akins 1970) but today consists only of 5263 ha of return-flow permanent sumps (USBR 1998). The first reported visits to the colony, in 1931 (Moffitt 1942) and on 16 May 1940 (WFVZ), produced no population estimates. In at least the 1950s and 1960s, gulls bred irregularly, mostly in the upper sump, on flattened mats of tules sheared off by ice (E. J. O'Neill pers. comm.). Up to about 400 pairs each of both species nested there in at least six years from 1952 to 1964, though the data, from the refuge's annual report, are of low quality (category 3; see above). Since 1964, gulls are known to have nested at Tule Lake only in 1990, when L. A. Moreno (pers. comm.) found 35 adult and 11 young Ring-billed on a small rocky island in the lower sump on 19 July. Shuford found no nesting activity during our 1994–1997 and 1999 surveys.

Conover's (1983) report of 1980 California and 11,818 Ring-billed gulls breeding at Tule Lake in 1976 is in error. Those figures are the sum of "peak population" estimates, *not* numbers derived from nest counts, for Clear Lake and Lower Klamath refuges combined; no nesting data were available for Tule Lake in 1976 (refuge's annual reports, J. Beckstrand in litt.).

Clear Lake NWR. Before its outflow was dammed in 1910, Clear Lake consisted of a west lobe of about 4048 ha of shallow open water and an east lobe of about 2024 ha of marshlands (Akins 1970). The dam created a reservoir of open water, which today covers about 9623 ha (USBR 1998). Willett (1919) visited the "usual breeding grounds on islands" in Clear Lake on 10 April 1918, prior to nest initiation, and estimated about 2000 gulls present, about 90% California and 10% Ring-billed. On 11 and 12 July 1933, H. M. Worcester (in Lincoln 1933) found California Gulls close to fledging on an island in Clear Lake from which the water had receded three miles.

Estimates for Clear Lake from 1952 to 1989 come from the Klamath Basin refuges' annual reports, those from 1990 to 1993 from the refuges' reports or L. A. Moreno-Matiella (in litt.), who was studying nesting American White Pelicans (*Pelecanus erythrorhynchos*) (Table 3). From the 1950s through at least the 1970s up to about 850 pairs of California Gulls nested at Clear Lake, and from the 1950s through the mid-1960s up to about 550 pairs of Ring-billed Gulls nested there, though the estimates are rough (quality category 3; see above). Subsequently, numbers of Ring-billed Gulls appeared to increase sharply, as population estimates from 1968 to at least 1972 ranged from about 1150 to 2100 pairs. Data from the mid-1970s through the early 1990s did not distinguish between the two species, but numbers of gulls as a whole appeared to increase. Most estimates during this period ranged from about 2500 to 5000 nesting pairs. Our more precise estimates (category 1) from 1994 to 2000 ranged from 1739 to 3922 pairs of Ring-billed Gulls and 432 to 1769 pairs of California Gulls (Table 1).

The location of waterbird colonies at Clear Lake varies annually as the availability of islands varies with changing lake levels (L. A. Moreno-Matiella pers. comm., Shuford pers. obs.). Nesting sites are (1) a large rocky island in

Table 3 Numbers of Nests (and Young) of California and Ring-billed Gulls at Clear Lake National Wildlife Refuge, 1952–1993

Year	California	Ring-billed	Unidentified
1952[a]	500 (950)	554 (1200)	
1953[a]	475 (900)	450 (950)	
1954[a]	685 (1850)	565 (1730)	
1955[a]	423 (994)	527 (1325)	
1956[a]	200 (210)	250 (260)	
1957[a]	"above 1956 levels"	"below 1956 levels"	
1961[a]	? (70)	? (30)	
1963[a]			600 (1750)
1964[a]	500 (600)	432 (500)	
1965[a]	100 (300)	470 (1500)	
1966[a]	250 (500)	500 (1000)	
1967[a]	500 (500)	140 (300)	
1968[a]	350 (500)	1885 (2300)	
1969[a]	150 (200)	2000 (2500)	
1970[a]	868 (950)	1165 (1800)	
1971[a]	878 (500)	2134 (1000)	
1972[a]	400 (460)	1690 (1200)	
1973[a]	? (520)	? (1080)	
1977[b]	"lower than 1976"	"lower than 1976"	
1985[a]			? (4300)
1986[a,c]			nearly 8000
1987[a,c]			3000
1988[a,c]			nearly 4500
1989[a,c]			5000
1990[d,e]			5000
1991[e,f]			4000+
1992[e,g]			2500 (2000+)
1993[e,h]			3400

[a]Data quality category 3, from refuge's annual narrative reports.

[b]Peak population and production slightly lower in 1977 than in 1976 because of human intrusion in colonies.

[c]One to two, of several, mixed gull colonies on islands near the Clear Lake dam.

[d]An aerial survey on 20 June revealed 2000 gull nests on an island north of the Clear Lake peninsula (1630 young on 27 June ground survey) and 3000 nests on an island near the Clear Lake dam.

[e]Data quality category 2, from L. A. Moreno-Matiella (in litt.) and/or refuge's annual narrative reports.

[f]About 4000 gull nests on an island at the north end of the Clear Lake peninsula were later abandoned when a landbridge was exposed, allowing predator access. A count by foot on 30 June found 450 adult gulls on Bird Island and 270 adults on Rocky Island; the former was connected to shore in early June and produced no young, the latter held 265 young on 24 July.

[g]Surveys by boat estimated 2000 gull nests on Rocky Island on 1 May and 500 nests on Bird Island on 10 June. Surveys by foot found 2000 young on Rocky Island on 13 July 1992. Exposed landbridges connected both islands to shore, and an electric fence was erected in late April or early May to protect various colonial waterbirds on Rocky Island.

[h]1000 gull nests on Rocky Island, 1500 on the island north of the peninsula, 400 on Bird Island, and 500 on islands in the west lobe.

the east lobe of the lake that becomes several smaller islands at higher lake levels; (2) Bird Island, a sandy island near the east shore of the west lobe; (3) a large low-lying island of soil and small rocks at the north end of the lake in the channel connecting the two lobes; and (4) various small low-lying islands resembling (3) in the northeastern corner of the lake. In some recent drought years, when a dropping lake level connected islands to the mainland, biologists erected electric fences, preventing coyotes from entering and disrupting colonies, particularly those of the White Pelican (D. Mauser, L. A. Moreno-Matiella pers. comm.). In 1991, without such fences, gulls abandoned about 4000 nests after a landbridge formed.

Goose Lake. Since at least 1976 gulls have nested intermittently on low-lying islands, or a peninsula, near the southeast shore of Goose Lake. B. E. Deuel (in litt.) noted both California and Ring-billed gulls nesting there, 1–22 June 1976. D. W. Winkler (in Conover 1983) estimated 1205 California Gulls breeding at Goose Lake in 1977. Conover (1983) mistakenly reported that S. A. Laymon found 1200 California Gulls and <20 Ring-billed Gulls at Goose Lake in 1977; Laymon (pers. comm.) did not visit that area in 1977. From 1979 to 1985, B. E. Deuel (in litt.) visited Goose Lake in most years to survey or band waterfowl. On 15 June 1979 he estimated 800 California Gulls were nesting on a large island. In 1980, gulls were breeding at Goose Lake but were not counted, and during aerial surveys 1–5 June 1981 an estimated 400 gulls of unknown species were nesting there. In 1983, gulls again bred, but rising waters reduced the size of the nesting island. An aerial survey on 1 June 1984 detected a colony of about 400 gulls on a peninsula close to the inundated former nesting island; gulls were again nesting on the peninsula in 1985 but in much smaller numbers than when they nested on a nearby island. Shuford surveyed shorebirds at Goose Lake each year in late April from 1991 to 1995 and found no evidence of gull nesting; drought prevailed 1991–1994. The colony remained unoccupied in May 1996 (R. Ryno in litt.) but was reoccupied in 1997 (Table 1, Figure 4). A rising lake level in 1998 and 1999 reduced available nesting islands; Shuford's surveys on 20 June 1999 and 19 June 2000 surveys revealed about 199 and 194 pairs of Ring-billed and 8 and 6 pairs of California gulls, respectively, nesting at the tip of a long peninsula.

Big Sage Reservoir. Big Sage Reservoir was completed in 1921 (DWR 1988); it now covers about 2133 ha (DWR 1988). B. E. Deuel (in litt.) first found gulls, mostly Ring-billed, nesting on islands here on 18 June 1976. During aerial surveys he found this colony active in 1980 and occupied by about 600 gulls 1–5 June 1981. From shore, on 2 July 1989, S. F. Bailey (pers. comm.) estimated >500 adult Ring-billed Gulls with young on an island in the middle of the reservoir; this colony cannot be censused completely from shore. In August 1992, the reservoir was completely dry, for the first time since 1935 (G. Dick pers. comm.), and it seems unlikely that gulls nested. But gulls had reoccupied the colony by 1994 (Table 1). Shuford visited the colony on 21 June 1999 and 20 June 2000 and found it dominated by Ring-billed Gulls in numbers similar to those in recent years but made no formal census. The reduced number of Ring-billed Gulls in 1997 could reflect a shift from Big Sage Reservoir to nearby Goose Lake, reoccupied that year for the first time in many years. In most years, the gulls

nest only at the east end of Bird Island, the large island in the south-central portion of the reservoir, though in 1995 21% were on a small unnamed island to the northeast.

Middle Alkali Lake. Shuford discovered California Gulls nesting on a small scrub-covered island adjacent to landlocked Hansen Island on the east shore on 30 April 1993, during an aerial survey for shorebirds. On 4 May, by airboat, he found about 300 adults on the island, but as most had not laid determining the size of the population was not possible. On 17 May 1994, Shuford and C. Alexander found the island (Figure 5) connected to the lakeshore by a peninsula of saturated mud, crossed by numerous coyote trails. They counted 71 nests with eggs, 9 of which had recently been preyed on, some destroyed nests, and several dead adult gulls that had suffered predation. They estimated that prior to nest loss that about 100 nests had been initiated. The colony was unoccupied from 1995 to 1997.

Eagle Lake. Accounts of the birds of Eagle Lake from the late 1880s and early 1900s mentioned breeding by California Gulls but gave no population estimates (Ray 1915, 1921; Townsend in Grinnell et al. 1930). Ray and others collected at least five egg sets at Eagle Lake in 1914, when, as in recent decades, the gulls nested at Pelican Point (egg data slips MVZ, SDNHM, WFVZ). On 22 June 1921 Grinnell et al. (1930) found four California Gull nests on a small rocky island, and on 13 June 1929 they counted about 50 California Gulls along with two nests on an island where White Pelicans nested.

Gould (1974) reported that California and Ring-billed gulls were nonbreeding summer residents at Eagle Lake in 1970 and 1971. Lederer (1976) counted 13 California Gull nests at Eagle Lake in 1974, a year when rising water had isolated the nesting island (Pelican Point, *fide* Shaw 1998). From 1 to 5 June 1981, during aerial waterfowl surveys, B. E. Deuel (pers. comm.) estimated 150 gulls nesting. In 1990 J. Bogiatto (pers. comm.) estimated 1500 to 2000 California and 300 to 400 Ring-billed gulls nesting on Pelican Point; only the California fledged young. By 1991 drought lowered the lake's level and the island became a peninsula; that year and in 1992 gulls initiated nesting but abandoned their efforts midseason, apparently because of disruption by terrestrial predators. Nesting resumed in 1995 (201 nests of the California, 132 of the Ring-billed counted) when rising water made Pelican Point an island again (Table 1). No gulls nested there in 1996, 1997, or 1999, despite its remaining an island (Shaw 1998, Shuford pers. obs.), but did in 2000 (no population estimates made, J. Bogiatto pers. comm.).

Honey Lake WA. Ring-billed Gulls have nested since at least about 1920 at Hartson Reservoir (Moffitt 1942), a natural freshwater lake separated from the north shore of saline Honey Lake by sand dunes. From incomplete surveys (category 3) on 3 May 1940 and 14 May 1941, Moffitt estimated 150 and 75 Ring-billed Gull nests, respectively, and inferred that the population totaled "250 or more pairs." Johnston and Foster (1954) reported that when Hartson Reservoir was very low in 1950 about 750 gull nests were "counted on a small duck pond near the refuge headquarters." Although Ring-billed Gulls predominated, they suspected that California Gulls also were breeding. After 1950 the gulls again used the small islands in

the reservoir. Nest counts (category 1) on 17 May 1953 revealed 717 pairs of the Ring-billed and 26 of the California on one island.

Various visitors from the mid-1950s to the mid-1980s estimated about 1500 to 4000 nesting gulls, the Ring-billed generally predominating (Table 4). In the extreme drought year of 1977, the numbers nesting were greatly reduced. On 23 June Winkler (1982, in litt.) found two nesting islands connected to the shoreline and dead adults and many destroyed eggs strewn about both colonies; on 19 July he found the colony abandoned. Such landbridging of natural islands during dry periods prompted refuge personnel to create additional islands in Hartson in the mid-1980s (K. Novick pers. comm.). Hartson Reservoir dried up in September 1990, and no gulls nested until 1993, after a very wet winter. Then high water reduced the number and size of the remaining islands, and most of the nesting gulls shifted to small islands in diked ponds north of Hartson (C. Holmes pers. comm.).

More accurate surveys (category 1) from 1993 to 2000 revealed 1727 to 2502 pairs of the Ring-billed and 1247 to 1913 of the California (Tables 1 and 2). The vast majority have nested on 9 to 18 small low-lying islands primarily near the north shore of Hartson Reservoir in the Dakin Unit (Figure 6b). In some years, up to 544 pairs of Ring-billed Gulls have nested on one to six small islands in diked ponds of the Dakin Unit north (units 6G and 6J) and east (Unit 5A) of Hartson Reservoir (Shuford pers. obs.). In 1994, about five pairs of Ring-billed Gulls nested in an isolated colony on a small island in a diked pond in Unit 15 of the Fleming Unit, the only known gull nesting at the refuge away from Hartson Reservoir or nearby ponds.

In May 1994, islands in Hartson Reservoir and Unit 6J were separated from the shoreline by only narrow shallow water or saturated mud; one formed a peninsula. On 15 May Shuford saw a coyote on the islands. B. Tatman (in litt.) found three islands that had had 631 nesting paris abandoned on 7 June and 6 July and on 13 July counted 894 dead chicks on four islands that initially held 2398 nesting pairs.

Lake Almanor. This reservoir was created in 1913; today it covers 11,435 ha (DWR 1988). California Gulls were first reported nesting here in 1992, when a boat survey by H. Green (pers. comm.) revealed about 250 adults, many sitting on nests or courting or copulating, on a low-lying island along the east shore roughly 1–1.5 km south of the causeway at the north end of the reservoir. Distant views of the island via spotting scope from the causeway on 5 May 1993 revealed about 550 adult California Gulls, some of which were copulating, but views were inadequate to reveal nests (Shuford pers. obs.). The lake's level was rising at the time, and by late May the island was inundated (J. Evans pers. comm.), terminating any nesting attempt. Similarly, visits from late April to June, in 1995, 1996, 1997, 1999, and 2000 found the island tiny or submerged and yielded no evidence of gull nesting (Shuford, H. and P. Green pers. obs.). This island apparently is available for gull nesting under only a very narrow range of lake levels (H. Green pers. comm.).

Sacramento and San Joaquin Valleys. California Gulls formerly nested at a shifting station in the middle stretches of the Sacramento River (Dawson 1923, Grinnell and Miller 1944). Egg data slips (MVZ, SBCM, WFVZ) confirm the collection in the Sutter Basin, Sutter County, of at least six egg

Table 4 Numbers of Nesting California and Ring-billed Gulls at Honey Lake Wildlife Area, 1956–1990

Date	California	Ring-billed	Unidentified	Source
26 May, 2 Jun 1956[a]	~500 adults	~2000 adults		W. M. Anderson *fide* MPCR notebooks
22–23 May 1963[a,b]	~1025 nests	~1025 nests		Anderson (1965)
15–17 May 1964[a,c]	present	~2000 adults		WFVZ collection
16 Jul 1976[d]	40 young, 710 adults	700 young, 1800 adults		MPCR notebooks, R. Stallcup (pers. comm.)
11 Jun 1977[a,e]		40 nests, 80 adults		S. A. Laymon (pers. comm.) *contra* Conover (1983)
23 Jun 1977[a]	5 nests, 0 young, 15 adults	16 nests, 0 young, 100 adults		Winkler (1982, in litt.)
10 Jun 1979[a]	4 adults	8000 adults		S. A. Laymon (pers. comm.)
17 May 1980[a]			350 adults	D. A. Airola (pers. comm.)
15 Jun 1980[a]	500 adults	3000 adults		S. A. Laymon (pers. comm.)
2 May 1981[a]			600 adults	D. A. Airola (pers. comm.)
13 Jun 1981[a]	500 adults	1000+ adults		S. A. Laymon (pers. comm.)
5 May 1984[a]			2200+ adults	D. A. Airola (pers. comm.)
29 May 1984[a,f]			1600 adults	B. E. Deuel (in litt.)
15–17 Jun 1985[a]	80 nests	40 nests		S. A. Laymon (pers. comm.)
14 May 1990[g]	1400 nests, 3012 adults	1928 nests, 3120 adults		J. R. Jehl, Jr., and C. Holmes (in litt.)

[a]Data quality category 2.

[b]Hartson Reservoir filled nearly to capacity. Anderson counted 2050 gull nests on several islands and estimated that numbers of California and Ring-billed gulls were about equal.

[c]L. R. Howsley, R. Quigley, and K. E. Vorce collected at least 9 sets of Ring-billed Gull eggs from a colony of "1000 pairs" nesting on small islands in Hartson Reservoir; they also collected at least 2 sets of California Gull eggs from a small island with "only about 10 pairs."

[d]Data quality category 3.

[e]Conover (1983) reported that S. A. Laymon estimated 160 Ring-billed and 10 California gulls were breeding at Hartson in 1977. Laymon's field notes, however, mention an estimate of 40 nests and 80 adults of the Ring-billed and none of the California (S. A. Laymon pers. comm.).

[f]From aerial survey; gulls nesting on four islands.

[g]Based on direct nest counts on smaller islands and extrapolations from nest counts on transects across larger islands. (data quality category1)

Figure 6. (a) Pelican Point was unoccupied by nesting gulls when connected to the shoreline south of Spaulding Tract, Eagle Lake, Lassen County, near the end of a prolonged drought. (b) Aerial view of Hartson Reservoir, Dakin Unit of Honey Lake WA, abutting the north shore of Honey Lake, Lassen County, in the background; low water levels during a prolonged drought gave coyotes access to the gulls' nesting islets on the north shore of Hartson and in adjoining ponds.

Photos by W. D. Shuford, (a) 23 May 1994 and (b) 24 May 1994

sets from 21 to 24 May 1910 and 46 sets on 25 May 1911. On the former dates, C. S. Thompson found the colony about 7 miles from the Sacramento River. On the latter, H. A. Snow estimated about 200 pairs of gulls nesting near Riego within 2 miles of the Sacramento River. Both collectors indicated the colony was situated in overflow lands, where snow-melt waters that initially surrounded the nesting island had receded and left it high and dry at the time of their visits. Extensive construction of water-storage and flood-control structures later in the century has virtually eliminated such seasonal habitat in the Sacramento Valley.

On 14 June 1925, W. B. Sampson collected at least four sets of California Gull eggs from a small island in Woodward Reservoir south of Eugene, Stanislaus County, in the northern San Joaquin Valley (WFVZ egg data slips). Grinnell and Miller (1944) apparently were unaware of these data.

Mono Lake. Mono Lake is second only to Great Salt Lake in numbers of breeding California Gulls (Conover 1983, Paul et al. 1990, Winkler 1996). The extensive historical record on gull nesting at Mono Lake has already been presented and debated by Jehl et al. (1984, 1988) and Winkler and Shuford (1988). Regardless, it is clear that numbers of breeding gulls at Mono Lake have increased from the low thousands early in the century to tens of thousands in the 1970s to 1990s. Since 1983, the population has ranged from about 17,500 to 32,500 pairs with no clear trend (Figure 7). Storms at Mono Lake preceding the 1991, 1995, and 1998 breeding seasons appeared to delay initiation of nesting and prolong egg laying (PRBO unpubl. data), leading to underestimation of the breeding population. Such weather also likely reduced nesting attempts; in Wyoming many younger California Gulls may skip breeding in years of unusually harsh weather (Pugesek and Wood 1992, B. Pugesek pers. comm.). Before 1979 the vast majority of nesting gulls occupied volcanic Negit Island; they abandoned it that year when a dropping lake level exposed a landbridge, allowing coyotes to enter the colony (Winkler and Shuford 1988). Subsequently, most gulls have bred on two clusters of smaller islets—the Negit and Paoha islets (Figure 8). The former are composed primarily of volcanic rock, the latter of easily eroded lake-bottom sediments. From 1983 to 2000, 64% to 91% of the lake's nesting population has occupied the Negit Islets (Figure 7). Gull numbers increased on the Paoha Islets when their acreage increased during a period of declining lake level in the early to mid-1990s and on Negit Island during a period of recolonization in the mid-1980s to early 1990s. Since the late 1970s the lowered lake level periodically has enabled coyotes to reach some of the islands and cause the gulls to abandon their nests (Winkler and Shuford 1988, PRBO unpubl. data). Protection of the gull colonies was one of the factors in a water board's decision to restore Mono Lake by allowing the lake to rise from the 1994 level of 6374 feet (1943 m) above sea level to 6391 feet (1948 m), a process expected to take about 20 years (SWRCB 1994) but so far hastened by wet winters.

San Francisco Bay. San Francisco Bay supports the only coastal colonies of the California Gull (Winkler 1996), largely on abandoned levees, levee roads, and dredge-spoil islands in remote regions of the salt ponds, active and abandoned, at the bay's south end (Figure 9). Creation of the ponds began about 1860; by the 1930s about 12,145 ha of tidal marsh had been

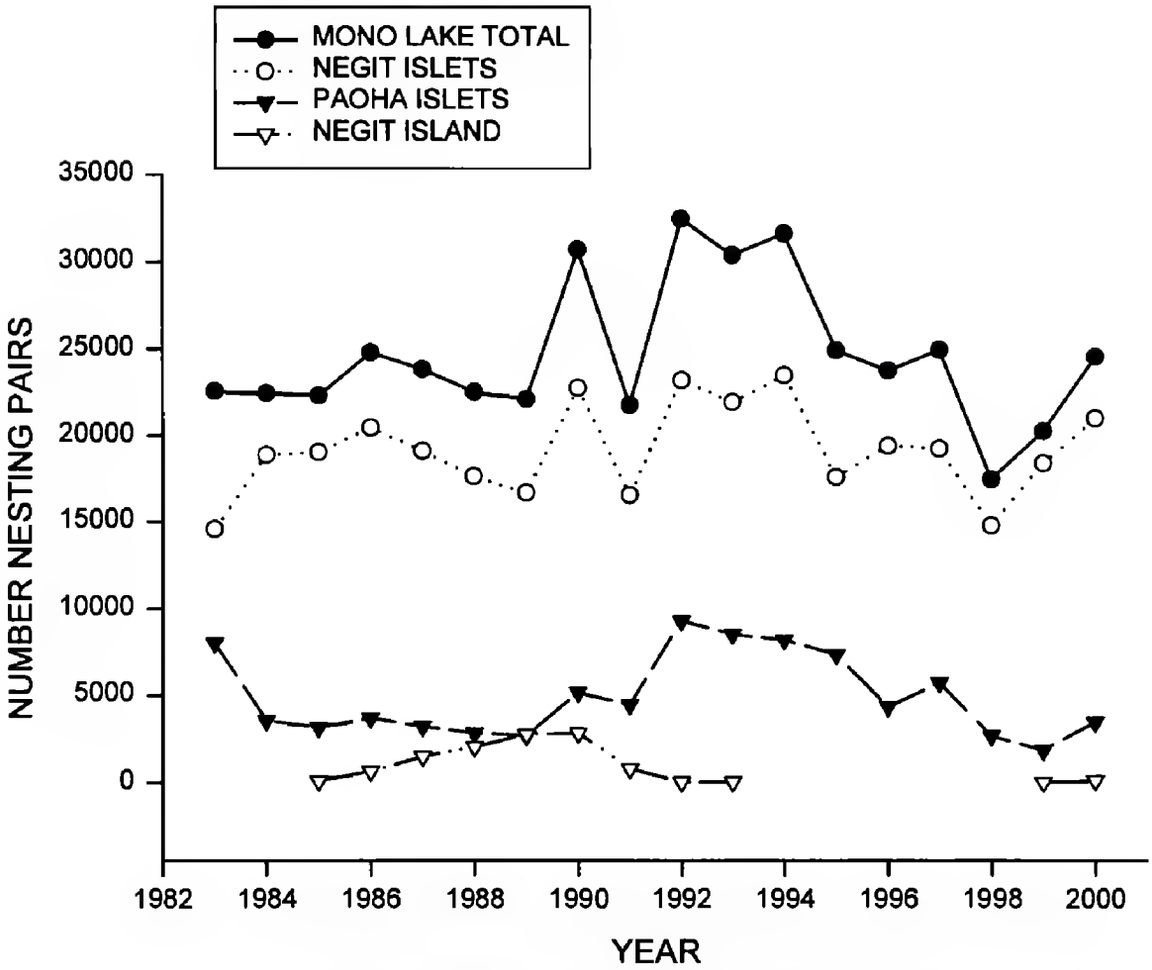

Figure 7. Trends in numbers of nesting pairs of California Gulls at Mono Lake, Mono County, California, 1983 to 2000. Totals presented for the entire lake and for three subsections: the Negit Islets, the Paoha Islets, and Negit Island.

converted into them. California Gulls were first discovered breeding in south San Francisco Bay in 1980 on a levee in Pond A6 at the Knapp property near Alviso, Santa Clara County (Jones 1986). The colony grew exponentially as birds expanded to an adjacent parallel levee in 1982 and to an adjacent road in 1986 (Table 5, Figure 10). Since 1983, California Gulls have colonized eight additional sites in San Francisco Bay, establishing the species' second largest breeding aggregation in the state. Six are in salt ponds in the south bay, two are in the central bay, one on an island in a wetland and on nearby breakwaters at the Alameda NAS, Alameda and San Francisco counties, the other on Brooks Island, Contra Costa County. The source of the bay's population is unknown, but it must be immigration, since local chick production alone cannot account for its rapid growth.

Nevertheless, California Gulls face some threats in south San Francisco Bay. Introduced Red Foxes (*Vulpes vulpes*) were first sighted at Pond A6 in 1991, subsequently near the colonies at Alviso Pond, Moffett, and Mowry 2. These colonies were partially or completely abandoned in the following sequence: Pond A6 (1991–1997), Alviso Pond (1991–1995), Mowry 2 (1995), and Moffett (1997). All of these colonies are either permanently attached to the mainland or become landbridged when waters recede early

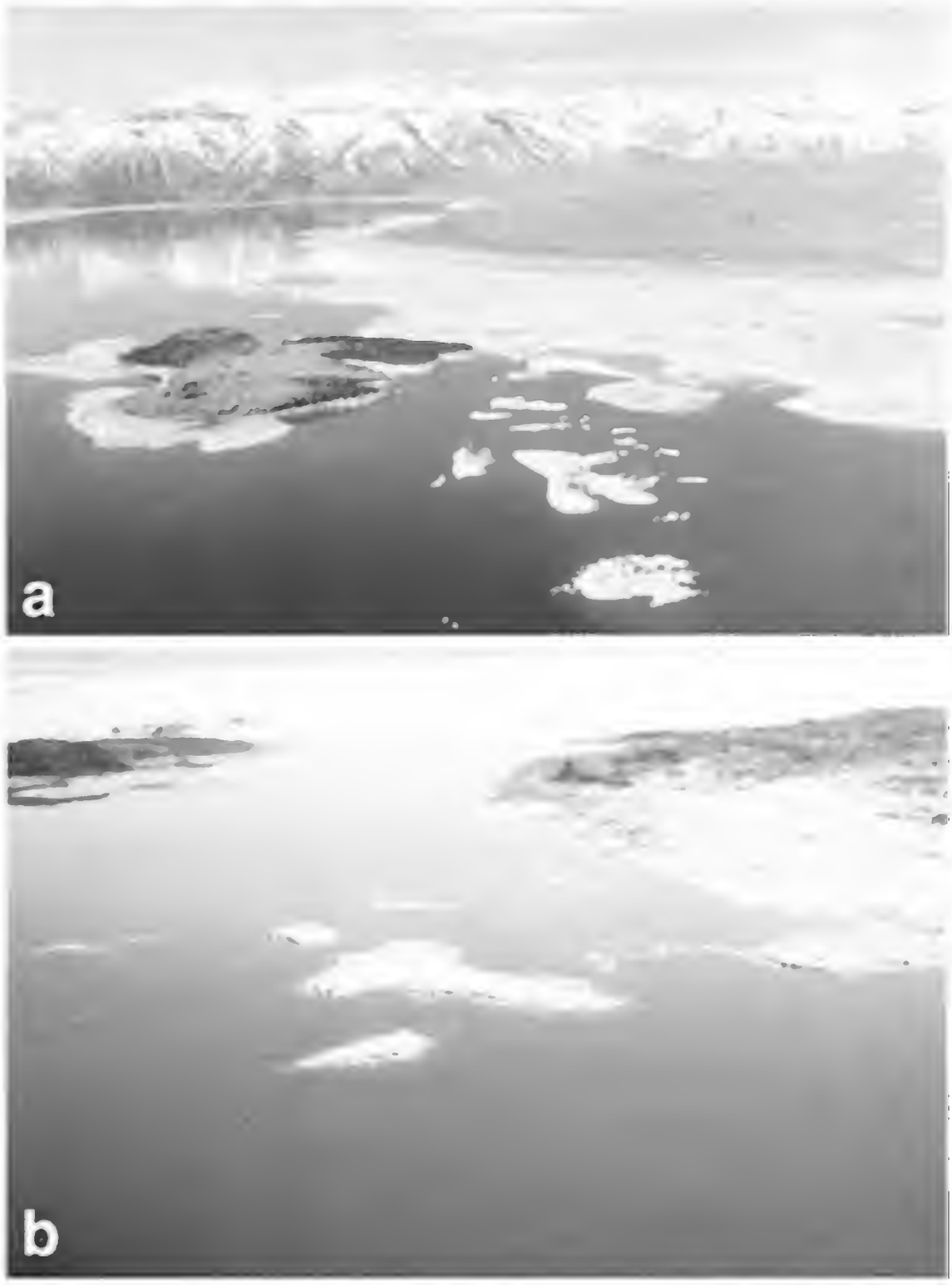

Figure 8. Aerial views of California Gull nesting islands at Mono Lake, Mono County. (a) The Negit Islets in right foreground flanked to left by the larger, darker Negit Island, shown here connected to the mainland by a landbridge at a lake elevation of about 6372 feet; the steep, snow-covered eastern escarpment of the Sierra Nevada is in the distance. (b) The Paoha Islets (center) off the western shoreline of Paoha Island, with Negit Island and the Negit Islets in the left background.

Photos (a) courtesy Mono Lake Committee, circa 1982, and (b) by W. D. Shuford, 24 May 1994

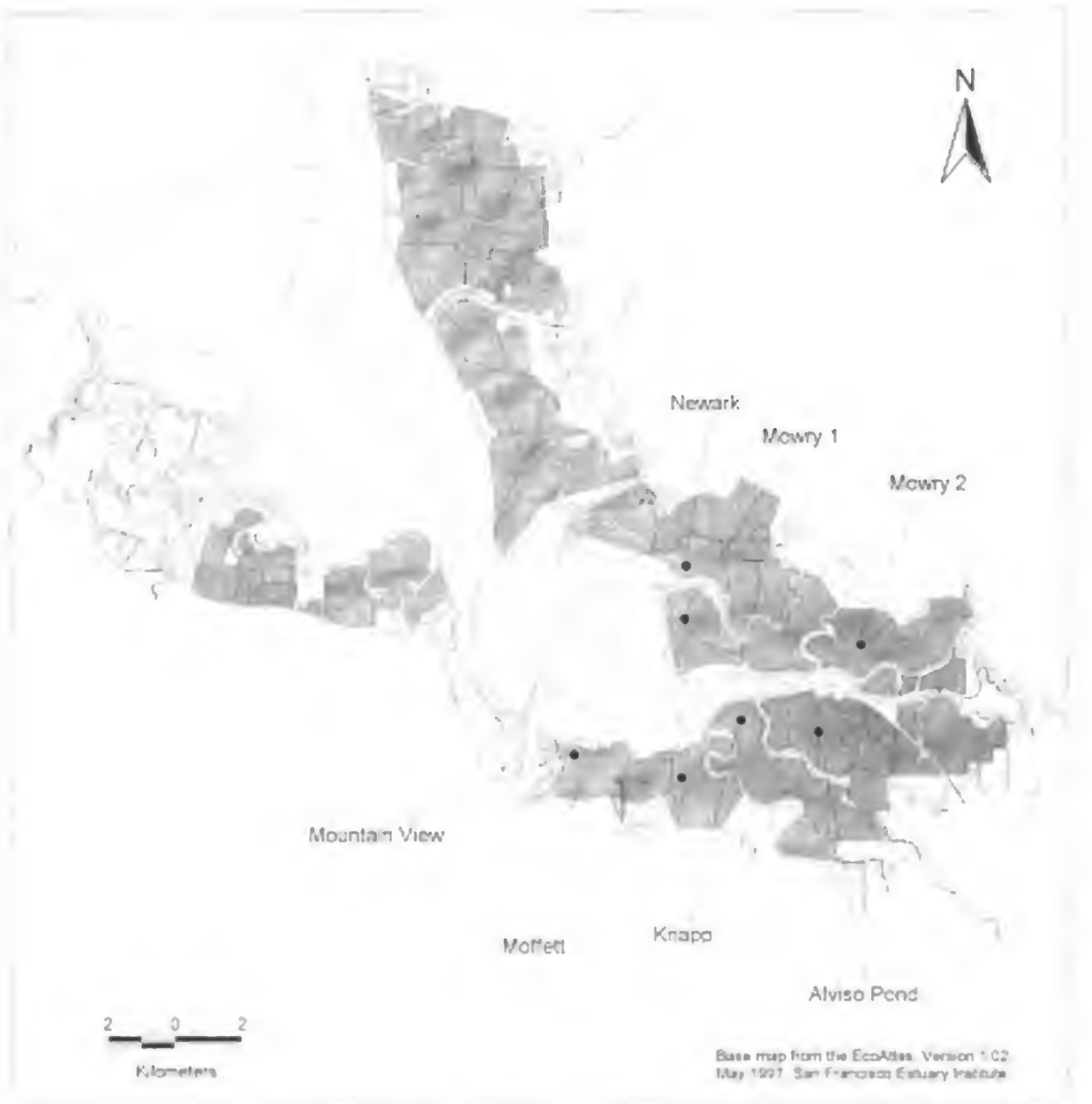

Figure 9. Location of California Gull colonies in south San Francisco Bay salt ponds (shaded); see Table 3 for data on colony sizes. The Alameda NAS and Brooks Island colonies in the central bay are not depicted.

in the nesting season. Additionally, the Don Edwards San Francisco Bay NWR purchased the Knapp property from Cargill Salt Division in 1989, and the pond remained an active salt evaporator until 1993. Since then the pond has not been actively managed and no water has been pumped into it.

Salton Sea. Small (1994) reported a failed nesting attempt of a single pair of California Gulls at the south end of the Salton Sea, Imperial County, in July 1976, and two pairs laid eggs but failed to fledge young at the north end of the Salton Sea, Riverside County, in 1996 (*Field Notes* 50:996). In 1997, 22 pairs of California Gulls bred successfully on a small rocky and sandy islet off Obsidian Butte at the south end of the Salton Sea; this colony increased to 37 pairs in 1998 and 40 pairs in 1999 (Molina 2000).

Other sites. Gulls have been reported breeding at three other sites in the

Table 5 Numbers of Pairs of California Gulls Nesting in San Francisco Bay, 1980–2000[a]

	Site								
Year	Knapp (Pond A6)	Newark	Alviso Pond	Mountain View	Mowry 1	Mowry 2	Moffett	Alameda NAS	Total
1980	12	—	—	—	—	—	—	—	12
1981	30	—	—	—	—	—	—	—	30
1982	206	—	—	—	—	—	—	—	206
1983	671	23	—	—	—	—	—	—	694
1984	808	22	21	—	—	—	—	—	851
1985	1113	277	187	—	—	—	—	—	1577
1986	1422	199	28	—	—	—	—	—	1649
1987	1657	11	46	—	—	—	—	—	1714
1988	2049	15	45	—	—	—	—	—	2109
1989	2121	0	217	—	—	—	—	—	2338
1990	2246	0	27	1	—	—	—	—	2274
1991	2588	0	0	—	—	—	—	—	2588
1992	2750	0	32	29	448	—	—	—	3259
1993	3423	—	90	39	57	0	6	3	3618
1994	3990	—	0	86	166	43	205	10	4500
1995	3618	—	2	4	633	0	50	50	4357
1996	3279	—	705	0	87	0	141	100	4312
1997	3128	—	878	22	620	0	328	100	5076
1998	3281	—	814	—	257	0	149	50	4551
1999	4690	—	1051	—	838	0	127	25	6731
2000	5741	—	993	—	1263	0	127	40	8168[b]

[a]Expressed as counts of active nests. Data of quality category 1, except at Alameda NAS where category 2 (see Methods). —, No survey made; 0, survey made but no nesting gulls found.

[b]Includes four nests at Brooks Island, Contra Costa County (S. Bobzien in litt.)

Figure 10. California Gulls nesting amid weeds and woody debris on abandoned levees in a salt pond at the Knapp property in south San Francisco Bay near Alviso, Santa Clara County.

Photo courtesy SFBBO archives, mid-1980s

interior of California, but information on these attempts is poorly documented or in error. Dawson's (1923) report of nesting at Lake Tahoe, El Dorado County, is unverified (Grinnell and Miller 1944). Cogswell's (1977) report of California Gulls breeding at Topaz Lake, and perpetuated from that source by Small (1994, A. Small pers. comm.), is erroneous (H. L. Cogswell pers. comm.). Finally, Small (1994) reported that Ring-billed Gulls have bred at Modoc NWR, Modoc County, on the basis of a refuge checklist only (A. Small in litt.), but refuge biologists know of no evidence that the species has ever bred there (R. L. Ryno pers. comm.).

Population Trends

Though Conover (1983) concluded that gulls have increased greatly in California and the rest of the West during the past century, the historical record is limited. We believe that Conover's (1983) comparisons to the early 1900s are inadvertently biased toward an increase because no author early in the century made a careful attempt to chronicle gull colonies, as Conover did for the recent period, and the number of persons likely to know of or report gull colonies has increased greatly since early in this century.

Even knowledge of the recent record is poor. For example, Conover (1983) reported only six gull colonies from the interior of California in the late 1970s to early 1980s, but we now know that 14 colonies in that area have been active, at least intermittently, since that time. Furthermore, the

methods and dates of surveys are reported infrequently, or the estimates are rough, made incidentally to other activities. Exemplifying the latter are two independent estimates of nesting gulls at Honey Lake in 1981 that differ by a factor of 2.5 (Table 4). Similarly, Paul et al. (1990) commented "sporadic records and unequal effort make data [on populations of the California Gull at Great Salt Lake] difficult to interpret." Also, the year-to-year fluctuations in gull numbers and nesting sites caused by changing water levels devalue estimating regional populations for a given time period by summing data collected from various sites in different years with wide-ranging environmental conditions. Gilligan et al. (1994) and Conover et al. (1979) reported fluctuations at individual colonies and shifting among colonies in Oregon and Washington, Paul et al. (1990) at Great Salt Lake, the latter during a period when the overall population was stable. Consequently, we believe that apparent trends should be interpreted with the utmost caution and only when the usually limited data are compelling. Conover (1983) recognized many of the limitations of the data available but still expressed apparent population trends in terms of percentage increase over time, a practice we consider indefensible.

Despite these caveats, we draw some conclusions. The clearest well-documented example of a population increase is in San Francisco Bay, where California Gulls initiated nesting in 1980 and now total over 8000 pairs. At Mono Lake, California Gulls have increased greatly in this century, but it is uncertain whether the population was recovering from a decline in the 1800s, as at Pyramid Lake, Nevada (Yochem et al. 1991). At Honey Lake, numbers seem to have increased, but even when accurate counts have been taken the population has fluctuated greatly with climatic conditions. At Clear Lake nesting populations appeared to increase from the 1950s to the late 1960s, remained relatively stable until increasing again in the mid-1980s, then dropped from 1998 to 2000. Some of these increases may have resulted from birds shifting from nearby Tule Lake or Lower Klamath NWRs, particularly in the 1980s when the Lower Klamath population of thousands of gulls decreased to near extirpation. While estimates at Big Sage Reservoir and Butte Valley suggest increases, these may be artifacts of a limited earlier record followed by more accurate subsequent counts or, again, shifting of birds from nearby colonies. For other sites, the data are too few or colony occupancy too intermittent to warrant interpretation of population trends. On the whole, populations of California Gulls, at least, have increased substantially in California in recent decades, driven largely by trends at Mono Lake and San Francisco Bay. The record before 1950 is too scant for trends then to be estimated with confidence.

Paul et al. (1990) traced the history of California Gulls breeding at Great Salt Lake, where the population remained relatively stable from 1931 through the 1980s, then rose dramatically from 1989 to 1990 (D. Paul pers. comm.). In Nevada Yochem et al. (1991) concluded that California Gulls increased from several thousand birds in the 1870s (followed by a decrease through 1920s) to about 15,000 birds in the 1980s. These conclusions were based on an inference that a description of the Pyramid Lake colony in 1868 as "immense" and spread over "several acres" equaled a population of 4000-6000 birds and that this was the entire population in

the region. Their rough estimates of 16,700 breeding gulls in 1985–1986 were followed by more accurate estimates of 10,700 in 1989–1990 (Yochem et al. 1991), suggesting gulls either shifted to other states or earlier estimates exaggerated the size of the population. Though these authors also reported rough estimates of 3000 pairs of California Gulls at Lahontan Reservoir 1983–1985, they omitted Alcorn's (1988) estimates of only 500 and >400 nests there in 1986 and 1987, respectively. We are skeptical that the Nevada population of California Gulls has increased greatly historically.

We remain uncertain whether the benefit to gulls of creation of islands in reservoirs, agricultural irrigation, and augmentation of the food supply on the wintering grounds has compensated for the loss of >90% of California's historic wetlands (Dahl 1990). Further research should concentrate on accurate population estimates via rangewide surveys and investigating gulls' responses to fluctuating environmental conditions.

Management Issues

The main threat to breeding gulls is the periodic scarcity of isolated nesting islands. This was particularly evident in 1994 when low water levels in northeastern California appeared responsible for a lack of suitable nesting islands at Goose Lake and Eagle Lake and for the formation of landbridges at Shasta Valley, Butte Valley, Clear Lake, Middle Alkali Lake, Honey Lake, and Mono Lake, allowing coyotes access to part or all of the colonies. Although periodic droughts are a natural phenomenon to which gulls are adapted, water diversions for human uses may exacerbate their effects. When possible, refuge managers and reservoir operators should maintain water levels that protect nesting islands for gulls. Despite the remoteness of many colonies, human disturbance is a potential threat. Seasonal closure of nesting islands has proved effective at Mono Lake (Shuford pers. obs.), but such restrictions or interpretive signing will likely be effective only where adequate personnel are available for enforcement or interpretation. In some instances such efforts might be counterproductive in drawing undue attention to nesting colonies. Protection of gull colonies will likely be most effective through comprehensive conservation plans that address the needs of all colonial waterbirds that nest together on islands.

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LITERATURE CITED

Alcorn, J. R. 1988. The Birds of Nevada. Fairview West, Fallon, NV.

Akins, G. J. 1970. The effects of land use and land management on the wetlands of the Upper Klamath Basin. M. S. thesis, Western Washington State College, Bellingham.

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Anderson, W. 1965. Waterfowl production in the vicinity of gull colonies. Calif. Fish & Game 51:5–15.

Cogswell, H. L. 1977. Water Birds of California. Univ. Calif. Press, Berkeley.

Conover, M. R. 1983. Recent changes in the Ring-billed and California gull populations in the western United States. Wilson Bull. 95:362–383.

Conover, M. R., Thompson, B. C., Fitzner, R. E., and Miller, D. E. 1979. Increasing populations of Ring-billed and California gulls in Washington state. W. Birds 10:31–36.

Dahl, T. E. 1990. Wetland losses in the Unted States 1780's to 1980's. U.S. Dept. Interior, Fish & Wildlife Service, Washington, D.C.

Dawson, W. L. 1923. The Birds of California. South Moulton Co., San Diego.

Department of Water Resources. 1988. Dams within jurisdiction of the state of California. DWR Bull. 17-88. Dept. Water Resources, P.O. Box 942836, Sacramento, CA 94236.

Finley, W. L. 1907. Among the gulls on Klamath Lake. Condor 9:12–16.

Gilligan, J., Smith, M., Rogers, D., and Contreras, A., eds. 1994. Birds of Oregon: Status and Distribution. Cinclus Publ., McMinnville, OR.

Gould, G. I., Jr. 1974. Breeding success of piscivorous birds at Eagle Lake, California. M. S. thesis, Humboldt State Univ., Arcata, CA.

Grinnell, J., Dixon, J., and Linsdale, J. M. 1930. Vertebrate natural history of a section of northern California through the Lassen Peak region. Univ. Calif. Publ. Zool. 35:226–227.

Grinnell, J., and Miller, A. H. 1944. The distribution of the birds of California. Pac. Coast Avifauna 27.

Hays, H., and LeCroy, M. 1971. Field criteria for determining incubation state in eggs of the Common Tern. Wilson Bull. 83:425–429.

Jehl, J. R., Jr., Babb, D. E., and Power, D. M. 1984. History of the California Gull colony at Mono Lake, California. Colonial Waterbirds 7:94–104.

Jehl, J. R., Jr., Babb, D. E., and Power, D. M. 1988. Commentary. On the interpretation of historical data, with reference to the California Gull colony at Mono Lake, California. Colonial Waterbirds 11:322–327.

Johnston, D. W., and Foster, M. E. 1954. Interspecific relations of breeding gulls at Honey Lake, California. Condor 56:38–42.

Jones, P. A. 1986. Aspects of the reproductive biology of the California Gull in Alviso, California. M. A. thesis, San Francisco State Univ., San Francisco.

Lederer, R. J. 1976. The breeding populations of piscivorous birds of Eagle Lake. Am. Birds 30:771–772.

Lincoln, F. C. 1933. White Pelicans lead their young to water. Condor 35:238–239.

Moffitt, J. 1942. A nesting colony of Ring-billed Gulls in California. Condor 44:105–107.

Molina, K. C. 2000. The recent nesting of California and Laughing gulls at the Salton Sea, California. W. Birds 31:106–111.

Paul, D. S., Jehl, J. R., Jr., and Yochem, P. K. 1990. California Gull populations nesting at Great Salt Lake, Utah. Great Basin Nat. 50:299–302.

Pugesek, B. H., and Wood, P. 1992. Alternate reproductive strategies in the California Gull. Evol. Ecol. 6:279–295.

Ray, M. S. 1915. Nesting of the American Osprey at Eagle Lake, California. Condor 17:70–74.

Ray, M. S. 1921. On the occurrence of the Buffle-head at Eagle Lake. Condor 23:192–193.

Remsen, J. V., Jr. 1978. Bird species of special concern in California: An annotated list of declining or vulnerable bird species. Nongame Wildl. Invest., Wildl. Mgmt. Branch Admin. Rept. 78-1. Calif. Dept. Fish Game, 1416 Ninth St., Sacramento, CA 95814.

Ryder, J. P. 1993. The Ring-billed Gull, in The Birds of North America (A. Poole, P. Stettenheim, and F. Gill, eds.), no. 33. Acad. Nat. Sci., Philadelphia.

Shaw, D. W. H. 1998. Changes in population size and colony location of breeding waterbirds at Eagle Lake, California between 1970 and 1997. M. S. thesis, Chico State Univ., Chico, CA.

Shuford, W. D. 1998. Surveys of Black Terns and other inland-breeding seabirds in northeastern California in 1997. Report 98-03, Bird and Mammal Conservation Program, Calif. Dept. Fish Game, 1416 Ninth St., Sacramento, CA 95814.

Shuford, W. D., Humphrey, J. M., and Nur, N. 1999. Surveys of terns and cormorants in California's Central Valley in 1998. Point Reyes Bird Obs. (Contr. 772), 4990 Shoreline Hwy., Stinson Beach, CA 94970.

Small, A. 1994. California Birds: Their Status and Distribution. Ibis Publ., Vista, CA.

State (of California) Water Resources Control Board. 1994. Mono Lake Basin water right decision 1631. State Water Resources Control Board, Division of Water Rights, P. O. Box 2000, Sacramento, CA 95810.

U.S. Bureau of Reclamation. 1998. 1998 Klamath Operations Plan Environmental Assessment. U.S. Bur. Recl., Klamath Basin Area Office, 6600 Washburn Way, Klamath Falls, OR 97603.

Willett, G. 1919. Bird notes from southeastern Oregon and northeastern California. Condor 21:194–207.

Winkler, D. W. 1982. Importance of Great Basin lakes in northern California to nongame aquatic birds, 1977. Wildl. Mgmt. Branch Admin. Rept. 82-4. Calif. Dept. Fish & Game, 1416 Ninth St., Sacramento, CA 95814.

Winkler, D. W. 1996. California Gull (*Larus californicus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 259. Acad. Nat. Sci., Philadelphia.

Winkler, D. W., and Shuford, W. D. 1988. Changes in the numbers and locations of California Gulls nesting at Mono Lake, California, in the period 1863–1986. Colonial Waterbirds 11:263–274.

Yochem, P. K., Jehl, J. R., Jr., Stewart, B. S., Thompson, S., and Neel, L. 1991. Distribution and history of California Gull colonies in Nevada. W. Birds 22:1–12.

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STATUS OF HUDSONIAN GODWITS ON THE YUKON–KUSKOKWIM DELTA, ALASKA

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ABSTRACT: Over 100 observations of the Hudsonian Godwit (*Limosa haemastica*) on the Yukon–Kuskokwim Delta in western Alaska since 1983 show that the species is a fairly common migrant, uncommon summer visitant, and rare, perhaps locally uncommon, breeder there. Spring arrival and fall departure dates are among the earliest and latest, respectively, in Alaska. Observations of breeding behavior and/or recently fledged young provide compelling evidence for breeding at ≥5 sites. Although some probable breeders are found along the taiga–tundra ecotone described as breeding habitat for the species elsewhere, others use dwarf-shrub meadows well beyond treeline. Postbreeding birds are usually found in low numbers, but occasional aggregations of ≥100 Hudsonian Godwits are among the largest concentrations of this species reported in Alaska. The Yukon–Kuskokwim Delta may support a significant fraction of the Hudsonian Godwit population in Alaska.

The Hudsonian Godwit is considered a species of high conservation concern (Brown et al. 2000), in part because of the isolation of its major breeding populations. It breeds in three disjunct regions of North America, Hudson Bay, northwestern Northwest Territories, and Alaska (Hayman et al. 1986), but our understanding of its breeding biology is derived almost exclusively from a single study near Churchill, Manitoba (Hagar 1966). In comparison to that among other shorebird species, gene flow among Hudsonian Godwit populations is very low, and the level of genetic differentiation among the three populations is one of the highest reported for any species of bird (Haig et al. 1997). These disjunct populations almost certainly differ in their migration strategies (Kessel and Gibson 1978) and may differ in use of breeding and staging habitats as well. Because of the potential differences among populations at the continental level, population-specific investigations are needed if effective conservation strategies are to be planned and implemented.

The value of population-specific data applies at smaller spatial scales as well. Within Alaska, current information suggests that Hudsonian Godwits may occur in disjunct populations separated by hundreds of kilometers. The species is a confirmed breeder only in south-central Alaska around Cook Inlet (Williamson and Smith 1964, Kessel and Gibson 1978). It is also considered an uncommon probable breeder 600–900 km northwest of Cook Inlet around Kotzebue and Norton sounds (Kessel and Gibson 1978) and a possible rare breeder at the base of the Seward Peninsula (Kessel 1989). Although these Alaska populations appear to be separated geographically, and may be separated genetically, the relative paucity of ornithological field work across much of the intervening distance has not allowed for a test of these hypotheses.

The Yukon–Kuskokwim Delta is between the two known or suspected centers of breeding in Alaska, situated immediately south of Norton Sound and 500 km west of Cook Inlet. As a result, the status of the species in this

area may shed light on the broader question of population distinctiveness within Alaska. Hudsonian Godwits have been considered rare summer visitants on the delta, an evaluation based upon a single observation at Takslesluk Lake and their regular occurrence in small numbers between late June and late August along the lower Kashunuk River (Kessel and Gibson 1978). Recent observations elsewhere on the delta, however, suggest that Hudsonian Godwit numbers are greater, seasonal occurrence is broader, and geographic distribution is more extensive than previously realized. Because effective conservation of a population is predicated upon an understanding of its status, we summarize Hudsonian Godwit observations on the delta since 1983. We include information on seasonal occurrence, distribution, numbers, and habitat.

STUDY SITE AND METHODS

At 80,000 km^2, the Yukon–Kuskokwim Delta is one of the largest deltas in North America (Thorsteinson et al. 1989). The greater delta region, including Nunivak Island, portions of the Kilbuck Mountains, and the uplands of the Andreafsky Wilderness, is included within Yukon Delta National Wildlife Refuge. The vast alluvial plain is dotted with innumerable lakes and ponds and drained by dozens of major rivers and scores of smaller streams and sloughs. Vegetation is predominantly wet grass and sedge meadows along the coast, moist sedge and dwarf-shrub meadows inland (Tande and Jennings 1986, U. S. Fish and Wildlife Service 1988, Kincheloe and Stehn 1991). Spruce and hardwood forests are more limited in distribution, extending from the eastern interior of the delta to within 100 to 125 km of the coast, primarily along the Yukon and Kuskokwim rivers and their tributaries.

Since 1983, we and our colleagues have recorded Hudsonian Godwit observations during the course of other field work on the refuge. For the purpose of this paper, we define "observations" as unique combinations of date and location, regardless of the number of birds detected. Details of sightings were either transcribed into field notes or recorded on cassettes at the time of the observations. Observations from the lower Kashunuk River are not included here because this site was already known to be within the species' range (Kessel and Gibson 1978). Descriptions of godwit habitats follow Kessel (1979).

Because of the location of both the refuge headquarters (Bethel, 60° 47′ N, 161° 47′ W) and our field projects over the last decade, most Hudsonian Godwit observations were from one of four regions: the Andreafsky Wilderness and vicinity, Bethel and vicinity, Kgun Lake, and Kigigak Island (Figure 1). The Andreafsky River drains the southern Nulato Hills, which are characterized by a series of northeast-trending ridges (which range from 300 to 900 m in elevation with rounded summits and gentle to steep slopes) dominated by dwarf-shrub meadows and, at higher elevations, dwarf-shrub mats. The valley of the Andreafsky River features a mosaic of riparian habitats including tall shrub communities, mixed deciduous–spruce forests, scattered woodland (i.e., riparian spruce bogs or "muskeg"), and wet meadows. Most of the Andreafsky watershed is included within the 5263-

km^2 Andreafsky Wilderness. We and/or our colleagues annually spent between 2 days and 4 months in this area; most field work occurred in May and June. Since 1985 we have visited 55 townships in the Andreafsky region.

The Bethel region is relatively flat and straddles the spruce taiga–tundra interface along the Kuskokwim River (Figures 1 and 2). Muskeg and wet meadows are widespread in the Kuskokwim's floodplain. Tall and medium shrub habitats occur both within and immediately adjacent to the forested river corridor; surrounding uplands are dominated by dwarf-shrub meadows. Observations in this region come primarily from scouting and censusing along Kuskokwim River Breeding Bird Survey routes since 1994, a breeding-bird inventory on National Guard training lands in 1995 and 1998 (Andres et al. 1999), and our observations within Bethel's city limits.

Kgun Lake lies between the Yukon and Kuskokwim rivers and is about 90 km from the Bering Sea coast (Figure 1). Kgun Lake is connected to smaller adjacent lakes and ponds by a complex network of sloughs. Rapidly changing water levels frequently result in the exposure of ephemeral mudflats among the Kgun Lake wetlands. Harwood was at Kgun Lake in 1993 (25 July–31 August) and 1994 (26 July–31 August).

Kigigak Island (32.5 km^2) is located along the Bering Sea coast (Figure 1). The island contains numerous shallow ponds and lakes as well as an extensive network of tidal sloughs. Vegetation communities range from low areas with wet meadows, grass meadows, and salt-grass meadows to dwarf-shrub meadows on small scattered uplands. The entire island is surrounded by mudflats ranging from a few tens of meters to several kilometers in width. We were at Kigigak Island from 17 July to 27 August 1995.

Although we never conducted surveys specifically for Hudsonian Godwits, we did conduct two additional bird surveys that covered extensive portions of the delta. During a duck-production survey from 1990 to 1992, we visited 260 plots of 259 ha each randomly distributed across the entire delta. In 1998 and 1999, we conducted 30 Breeding Bird Survey routes along the Yukon and Kuskokwim rivers. On these surveys, we recorded detections of all species of birds. Sites with Hudsonian Godwits other than the four major areas listed above are described briefly in Results.

RESULTS

We report 119 Hudsonian Godwit observations on the Yukon–Kuskokwim Delta since 1983. We made 88 observations; colleagues working with us made another four observations. Three additional sightings were reported by Andres et al. (1999). The remainder were located in field notebooks, files, or unpublished reports archived at Yukon Delta National Wildlife Refuge. Twenty-eight observations involved birds exhibiting distinctive breeding behaviors, including eleven observations of pairs, nine of courtship and/or territorial behavior, seven of predator-mobbing or distraction displays (indicating the presence of eggs or young), and one of a male with three recently fledged juveniles.

Of the observations reported here over 85% are from the Andreafsky Wilderness and vicinity, Bethel, Kgun Lake, or Kigigak Island (Table 1).

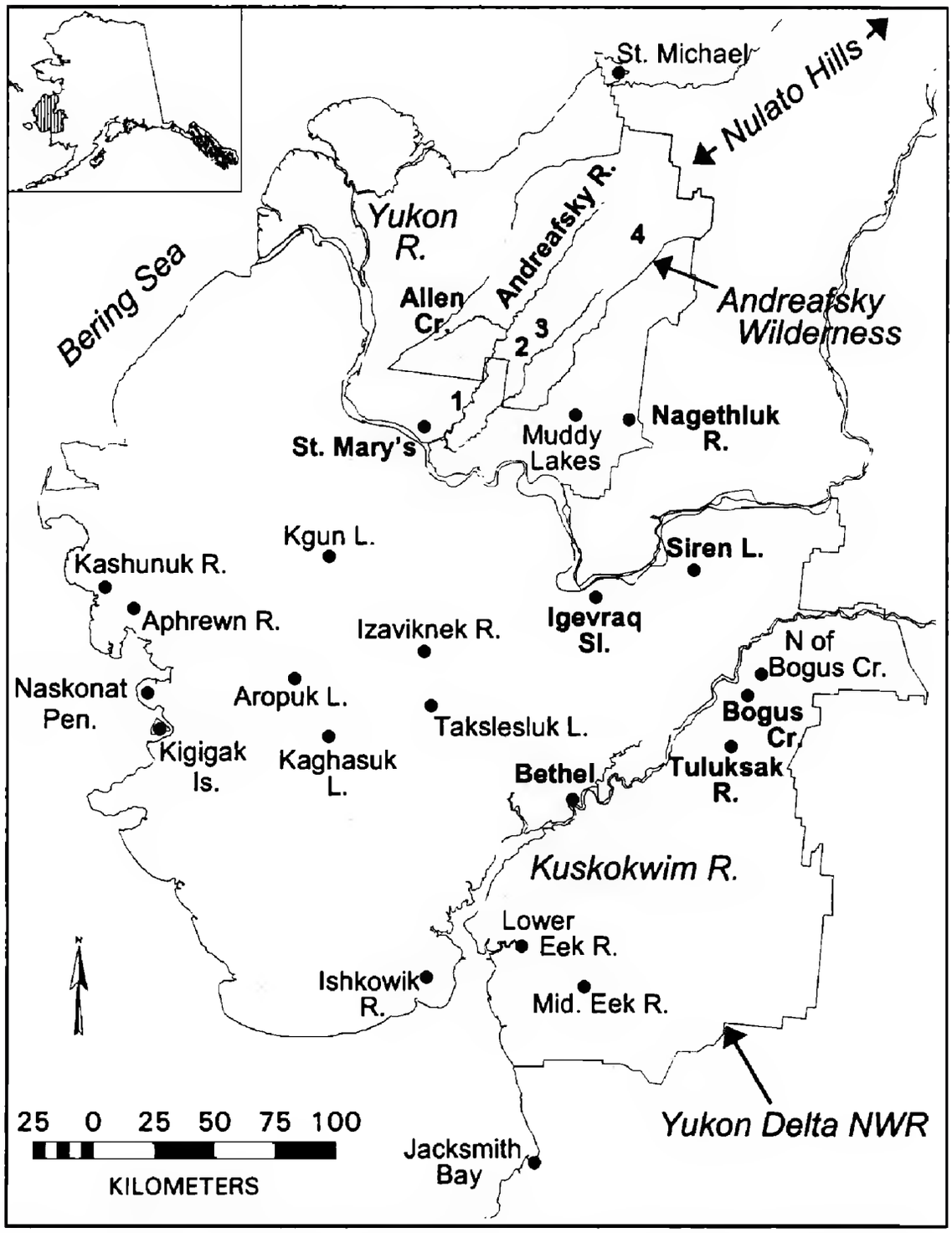

Figure 1. Yukon–Kuskokwim Delta with locations of Hudsonian Godwit observations. Locations in bold represent sites with pairs and/or probable breeders (i.e., birds exhibiting courtship and/or antipredator behavior). Numbered locations represent sites with breeding evidence within Andreafsky watershed in addition to Allen Creek (2 sites) and St. Mary's: 1, unnamed tributary of Andreafsky River; 2, along Andreafsky 3.5 km downstream of Allen Creek; 3, North Peak; 4, Needle Mountain.

Table 1 Summary of Hudsonian Godwit observations in four areas of the Yukon–Kuskokwim Delta, Alaska, 1985–1999

Location	Total obs.	Earliest date	Latest date	Observations by month				Breeding evidence
				May	Jun	Jul	Aug	
Andreafsky	28	5 May	26 Jul	15	10	3	nd[a]	Yes[b]
Bethel	25	2 May	29 Aug	10	10	3	2	Yes[b]
Kgun Lake	27	25 Jul[c]	17 Aug	nd	nd	11	16	No
Kigigak Island	21	4 Jul[d]	10 Aug	nd	nd	16	5	No

[a]nd, no data.

[b]See text for details.

[c]Hudsonian Godwits were seen on 25 July 1993 and 26 July 1994, our first days at Kgun Lake in those two years, respectively.

[d]Single observation noted on 4 July 1991. In 1995, the earliest date was 17 July, our first day at Kigigak Island.

Andreafsky Wilderness and Vicinity

Hudsonian Godwits were detected in 14 of the 55 townships visited in and around the Andreafsky Wilderness. The earliest spring record, 5 May 1986, involved a pair and a second male along the lower Andreafsky River, about 2 km northeast of St. Mary's. The river was still frozen, and the three birds were foraging on a mudflat that had been exposed as a result of sublimating shorefast ice. The pair was actively defending a feeding territory against the second male. Presumably the same trio was present at the same site nine days later. The latest observed northward migration was on 17 May 1986, 12 km NNW of St. Mary's, when two males flew northwest.

Single pairs were seen on upper Allen Creek and along the Andreafsky River, 3.5 km downstream of the mouth of Allen Creek, and two separate pairs were seen near Needle Mountain. We observed additional evidence of breeding at three other sites. Along lower Allen Creek on 15 July 1994, we saw a male and three recently fledged juveniles in a brood aggregation that included adults and young of Bristle-thighed Curlews (*Numenius tahitiensis*) and Whimbrels (*N. phaeopus*). Both species of curlews are confirmed breeders at that site, and we suspect that the juvenile Hudsonian Godwits were raised locally as well. Two of three individuals in that same area on 24 May 1999 were doing breeding flight displays. Also on 24 May 1999, a male Hudsonian Godwit and a Whimbrel mobbed a Rough-legged Hawk (*Buteo lagopus*) just west of North Peak. Finally, 23 km south of the wilderness border along an unnamed tributary of the Andreafsky, we saw four to six birds on 18 and 19 June 1985. At this site, godwits performed aerial advertisement displays, courtship chases, and attack-mobbing of human observers and a Golden Eagle (*Aquila chrysaetos*). The latest observations of Hudsonian Godwits in the Andreafsky watershed were of single birds along the middle Andreafsky River each day 24–26 July 1985.

Among 28 observations in the Andreafsky River watershed, three were of probable migrants (steady flight to north or northwest in May); the rest were in upland or wetland habitats. Among these 25 observations, 12 were in the river corridor of either the Andreafsky or its larger tributaries, primarily along riparian shorelines or in association with muskeg and wet meadows. The remaining 13 were in dwarf-shrub meadows beyond the influence of spruce.

Among observations involving only pairs and/or obvious breeding behaviors, four were in the river corridor and six were in dwarf-shrub meadows. Of the latter, three (including the adult male with recently fledged young) were along Allen Creek at elevations <100 m. The remaining three, including one in a valley west of North Peak and two near Needle Mountain in the upper Andreafsky watershed, as well as three single birds near the latter site, were found at elevations ranging from 130 to 475 m.

Bethel and Vicinity

The earliest spring migrants were observed on 2 May in both 1995 and 1997. The latest spring migrants were seen on 16 May 1991, when flocks of two and eight flew northwest over Bethel. The earliest record of breeding activity in the Bethel area was 20 May in both 1992 and 1998. In 1992 a male performed aerial advertisement displays 3 km south of Bethel, and in 1998 a pair performed courtship chases at Hangar Lake on the north edge of town. Additional evidence for breeding includes an alarm-calling adult at Akiachak on 30 June 1995, an alarm-calling and distracting pair at Bethel on 5 July 1995 (both in Andres et al. 1999), and a singing male along the Gweek River on 5 June 1999, where one or more adults were detected during the third week of June in four of five years from 1994 to 1998. The status of a pair at Atmautluak on 11 July 1998 could not be determined (Andres et al. 1999). The latest observation in the Bethel region was of a single bird flying east over Hangar Lake on 29 August 1998.

Near Bethel, we observed nearly all Hudsonian Godwits in or immediately adjacent to the floodplain of the Kuskokwim River (including a tributary, the Gweek River). Habitats ranged from muskeg to dwarf-shrub meadows, with most sightings either near the edge of spruce forest or in wet habitats within scattered spruce woodland. The pair at Atmautluak was a notable exception, occurring in an area dominated by wet meadows 30 km beyond the line of spruce trees.

Kgun Lake

In 1993 Harwood observed Hudsonian Godwits daily from his arrival on 25 July to 14 August, and then again on 17 August. In 1994 he saw godwits on only four dates between his arrival on 26 July and 4 August. The most seen on a single day was ten (26 July 1993). We do not know if an adult with a flying juvenile on 6 August 1993 was a local breeder or a migrant.

Kigigak Island

In 1995 we observed Hudsonian Godwits daily from our arrival on 17 July to 4 August, then again on 10 August. All were juveniles except for a single male in alternate plumage on 31 July. Most observations involved birds

feeding or commuting between feeding sites on the island. Hudsonian Godwits fed at low tide on the intertidal mudflats. During high tides, they roosted and fed inland in both low-lying salt-grass meadows and upland dwarf-shrub meadows, eating crowberries (*Empetrum nigrum*) in the latter habitat. Observations of passage migrants high over the island included two with 39 Bar-tailed Godwits (*L. lapponica*) flying southeast in a "V" on 22 July and one with 17 Bar-tailed Godwits flying south-southeast on 2 August.

Peak numbers on Kigigak Island occurred in late July. The maximum seen at one time was 18 individuals with 212 Bar-tailed Godwits on 23 July. Daily high counts, representing the total seen during a day's field work, did not necessarily represent distinct individuals. The maximum daily high count was 58 (8 separate sightings) on 22 July. At least ten birds were seen on eight days between 20 and 28 July, with ≥20 birds seen on 5 of those days. After 28 July, daily high counts were ≤6.

Other Observations

The remaining 18 observations were scattered across 16 sites (Figure 1, Table 2). This total includes detections on three of 260 duck-productivity plots (north of Bogus Creek, south of Izaviknek River, and near Ishkowik River) and on three of 30 riparian Breeding Bird Survey routes (Igevraq Slough, Bogus Creek, and Tuluksak River).

DISCUSSION

Spring Migration

In south-coastal Alaska, Hudsonian Godwits usually arrive in early May; the earliest dates are 28 April 1977 and 29 April 1997 on the Copper River Delta and in Cook Inlet, respectively (Kessel and Gibson 1978, Gill and Tibbits 1999). We detected Hudsonian Godwits as early as 2 May on the Yukon–Kuskokwim Delta, which is the earliest recorded arrival date for western Alaska. The arrival of birds at or near breeding sites on the delta in the first week of May (including a pair defending a feeding territory on 5 May 1986) suggests that at least some godwits en route to the delta use staging sites in south-coastal Alaska only briefly or not at all. If the latter scenario is accurate, delta breeders would have to fly directly to the breeding grounds from either still-unidentified spring staging areas or directly from the wintering grounds in southern South America (Morrison and Ross 1989, McCaffery 1996). Such a direct flight, a distance of ≥3,000 km, has been suggested for Hudsonian Godwits arriving in south-coastal Alaska (Kessel and Gibson 1978). Recent studies suggest that Bar-tailed Godwits may be capable of nonstop flights of ≥1,000 km between Alaska and New Zealand (Piersma and Gill 1998). Because the Hudsonian is a regular visitor in small numbers to New Zealand (Higgins and Davies 1996), at least some apparently have similar capabilities. If spring migrants also make nonstop flights from their wintering grounds (e.g., Chiloe Island, Chile; see McCaffery 1996), a direct route to the Yukon–Kuskokwim Delta is only 772 km (<6%) longer than a flight to the Copper River Delta and only 460 km (<4%) longer than a direct flight to Cook Inlet.

Table 2 Additional Records of Hudsonian Godwits on the Yukon–Kuskokwim Delta, Alaska, 1983–1999

Location	Date	Number of birds	Habitat[a]	Breeding evidence[b]
Aphrewn River	17 May 1999	1	a	none
Muddy Lakes	24 May 1983	1	b	none
Nagethluk River	2 Jun 1983	3	c, b	alarm calls
Lower Eek River	5 Jun 1985	<5	NR	none
Nagethluk River	7 Jun 1985	5	c, d, b	none
Nagethluk River	8 Jun 1985	3	c, b	none
Kaghasuk Lake	11 Jun 1998	200	e	none
Igevraq Slough	11 Jun 1998	1	f	singing male
Bogus Creek	15 Jun 1999	1	f, b	singing male
Tuluksak River	15 Jun 1999	1	f, b	singing male
Siren Lake	17 Jun 1992	1	a, b, g	attack-mobbing[c]
Naskonat Peninsula	27 Jun–3 Jul 1992[d]	1	a	NR
Middle Eek River	2 Jul 1985	<5	NR	NR
Jacksmith Bay	13 Jul 1998	30	e	none
North of Bogus Creek	25 Jul 1992	1	NR	NR
South of Izaviknek River	31 Jul 1992	2	NR	NR
Ishkowik River	4 Aug 1992	1	NR	NR
Southwest of Aropuk Lake	14 Aug 1998	150–200	e	none

[a]a, wet meadow; b, dwarf shrub tundra; c, quaking bogs surrounding upland lakes; d, grassy island in upland lake; e, mudflats; f, riparian woodland; g, open spruce woodland; NR, not recorded.

[b]Courtship displays and/or antipredator behaviors.

[c]Male attack-mobbed a Northern Harrier (*Circus cyaneus*).

[d]Single observation between 27 June and 3 July, but exact date not specified in field notes (Yukon Delta Natl. Wildlife Ref. files).

Breeding

From courtship and/or anti-predator behavior, we consider Hudsonian Godwits to be probable breeders at ≥15 locations on the Yukon–Kuskokwim Delta: Andreafsky Wilderness region (≥2 sites) , Bethel (≥3 sites), Nagethluk River, Siren Lake, Igevraq Slough, Bogus Creek, and the Tuluksak River. In addition, we consider godwits at Muddy Lakes and on the Eek River (middle and lower) to be possible breeders on the basis of their occurrence in habitats similar to that used by Hudsonian Godwits exhibiting breeding behavior elsewhere on the delta.

Observations during the breeding season at Bethel and Siren Lake were in habitat mosaics including woodlands (either spruce or mixed spruce–deciduous) and open wetland habitat (either bogs or wet meadows), usually with dwarf-shrub meadows adjacent or nearby. Half of the observations in the Andreafsky area were in similar habitats. Wet meadows near the interface of taiga and tundra have been identified as important habitat characteristics for breeding Hudsonian Godwits elsewhere in Alaska (Williamson and Smith 1964) and Canada (Hagar 1966). We failed to detect Hudsonian Godwits at many sites with these habitat characteristics, however, and some sites with

godwits lacked taiga and/or wet meadows. For example, near the Nagethluk River and at several sites in the Andreafsky watershed, Hudsonian Godwits were found in dwarf-shrub meadows well away from treeline. At the Nagethluk, godwits were found in association with lacustrine quaking bogs, but in the Andreafsky watershed, a few observations were in dwarf-shrub meadows several kilometers away from the nearest large wetlands.

The absence of Hudsonian Godwits from many areas of apparently suitable habitat produced a patchy breeding-season distribution on the delta. For example, in the Bethel region (Figure 2), we found them in Bethel and along the Gweek River, and Andres et al. (1999) found them at Akiachak and Atmautluak as well. Hudsonian Godwits were not seen, however, in Napaskiak (Williamson 1957), Napakiak, Nunapitchuk, Kwethluk, or Akiak (Andres et al. 1999). We do not know if this patchiness is a function of very low abundance, annual variation in site occupancy, and/or subtle habitat differences between occupied and unoccupied sites. A detailed analysis of breeding habitat use by Hudsonian Godwits throughout their range, including a consideration of regional variation, is warranted.

Postbreeding

Observations of postbreeding birds on the Yukon–Kuskokwim Delta, including the latest record for the species in western Alaska (29 August), were widely distributed (Figure 1). Except at Kgun Lake, we do not know if

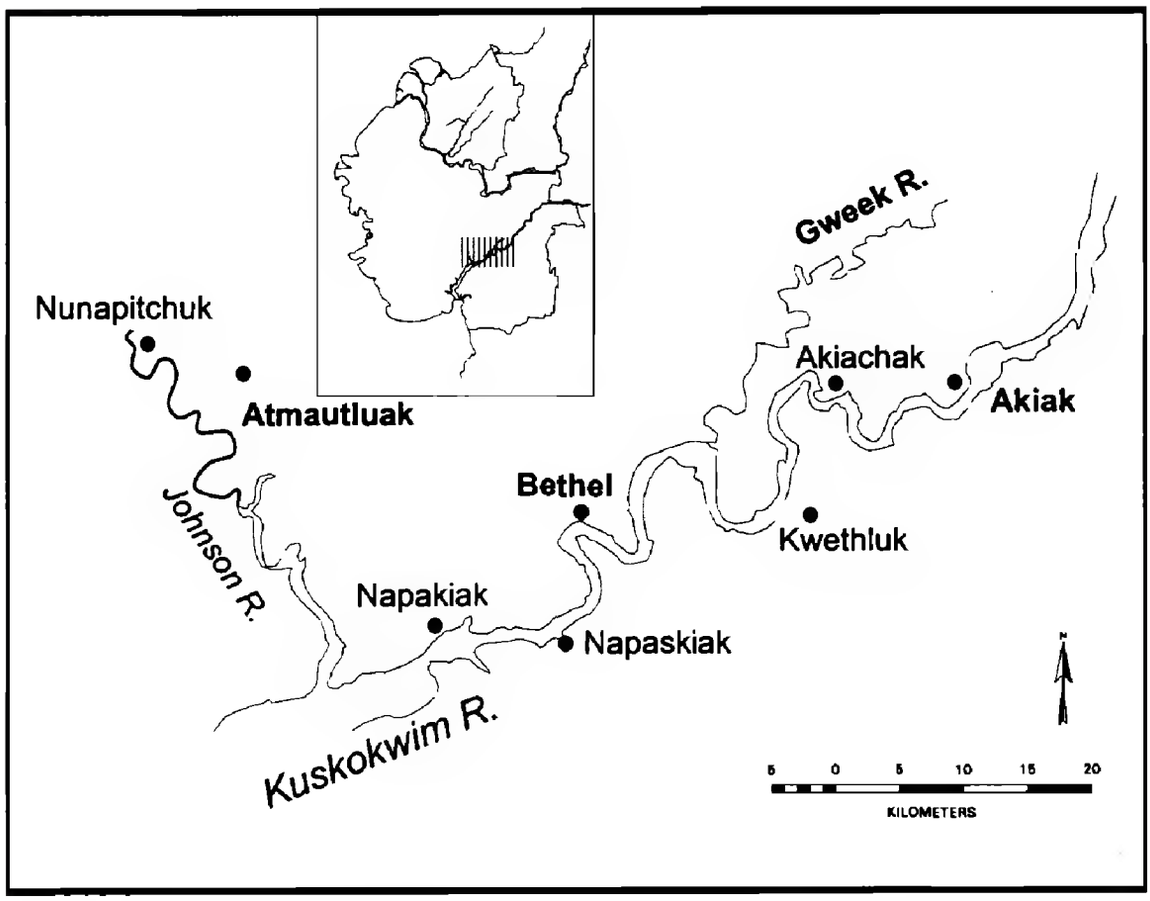

Figure 2. Bethel and vicinity, with villages mentioned in text. Locations in bold represent sites with pairs and/or probable breeders (see Figure 1 for definition).

use of these sites is consistent from year to year, nor do we know if there are more such sites. We also do not know if the inland sites (e.g., Kgun, Takslesluk, and Aropuk lakes) are used independently as isolated staging areas, as a network of wetlands to be exploited sequentially as birds move south, or opportunistically as precipitation and wind allow. Along the coast, postbreeding godwits have been seen at the mouth of the Yukon River (refuge files), the lower Kashunuk River, Kigigak Island, and Jacksmith Bay. Surprisingly, however, they were not detected on either ground or aerial surveys of the extensive mudflats of the central delta (Gill and Handel 1990). This is particularly unexpected because the surveyed area included sites along the outer coast <10 km west and north of the Kashunuk River and Kigigak Island, respectively.

In western Alaska, Hudsonian Godwits may move south through coastal areas at least as far as Carter Bay, 25 km south of Jacksmith Bay. At Carter Bay, migrant adults peaked during the third week of July and then dropped off rapidly, while juveniles peaked during the first week of August (Seppi 1997). If birds are drifting south, these data are consistent with our observations at Kigigak Island, 240 km to the north. We did not arrive at the site until the third week of July and saw only a single adult, but juveniles peaked in the fourth week of July.

We do not know the migratory destinations of Hudsonian Godwits after they leave southwest Alaska. Numbers in Cook Inlet are low during autumn migration (Gill and Tibbitts 1999), and it is unlikely that that site serves as a major staging area for the delta's birds. Quill Lakes in Saskatchewan may support a few thousand Hudsonian Godwits annually (Alexander and Gratto-Trevor 1997), and genetic analyses indicate that these birds are from the Alaska breeding population (Haig et al. 1997). The birds using Quill Lakes, however, are predominantly adults. Numbers peak 1–4 weeks after the adults' peak at Carter Bay (Alexander and Gratto-Trevor 1997, Seppi 1997). Even if Quill Lakes do support adults from western Alaska during autumn migration, the staging sites and routes used by juveniles remain to be discovered. In addition, the wintering grounds of Alaska breeders have not been determined. Identifying the sites used by the Alaska population throughout the annual cycle should be a high conservation priority.

Other Observations

Several observations cannot be confidently classified by migratory or breeding status. Because two single birds on wet coastal meadows on the Aphrewn River and Naskonat Peninsula exhibited no breeding behaviors and were in a habitat not known to be used by breeding birds, we suspect that they were a spring migrant and a failed or nonbreeder, respectively. Details of behavior and habitat were not recorded for the birds observed north of Bogus Creek, south of the Izaviknek River, and near the Ishkowik River, so we cannot infer their status.

Perhaps the most intriguing observation was of a flock of 200 birds in alternate plumage feeding on a mudflat in Kaghasuk Lake on 11 June 1998. Our observations elsewhere on the delta indicated that breeding birds should be on their territories (and perhaps incubating) by the second week of June. The Kaghasuk flock seemed too late for spring migrants and too early for an

aggregation of failed breeders. Similar numbers of Hudsonian Godwits have been found in early June at the mouth of the Koyuk River in northwest Alaska (Kessel and Gibson 1978) and in Cook Inlet in south-central Alaska (Gill and Tibbitts 1999). The status of birds in these early June concentrations is unknown.

Relationships Among Alaska Populations

Historical and recent sightings of Hudsonian Godwits on the Yukon–Kuskokwim Delta are distributed from St. Michael in the north (Grinnell 1910) to Jacksmith Bay in the south (this study), a distance of nearly 450 km. Godwits occur from the outer coast, along the lower Kashunuk River (where they occur annually in small numbers; C. Ely, pers. comm.) and at Kigigak Island, east to at least 240 km inland. The geographic breadth of these observations suggests that the degree of spatial isolation among the Alaska breeding populations of the Hudsonian Godwit may not be as extreme as previously supposed. Probable breeders near Needle Mountain in the northern Andreafsky Wilderness (Figure 1) were only 120 km south of Unalakleet along eastern Norton Sound, where Andres et al. (1999) classified the species as a possible breeder. Similarly, possible breeders along the Eek River (Figure 1) were only 160 km NW of villages around Nushagak Bay, where Hudsonian Godwits were confirmed as breeders by Andres et al. (1999). In addition, this latter region is only 350 km west of sites used by Hudsonian Godwits in Cook Inlet, and much of the intervening distance consists of habitats used by godwits elsewhere in southwest Alaska. We hypothesize, therefore, that the Hudsonian Godwit may have a roughly continuous distribution in Alaska from Cook Inlet west and north to Kotzebue Sound. If this hypothesis can be supported by additional field work and/or genetic analyses, it may be appropriate to consider Alaska breeders as a single population.

Relative Abundance and Status on the Yukon–Kuskokwim Delta

Large concentrations of Hudsonian Godwits are rare in Alaska. Kessel and Gibson (1978) reported maximum spring and fall counts of 204 and 106 birds, respectively, in south-coastal Alaska. More recently, hundreds have been found during migration in Cook Inlet, with up to 1000 or more present during peak periods (McCaffery 1996, Gill and Tibbitts 1999). Virtually all other observations of concentrations ≥100 birds are from western Alaska. Just south of the delta, hundreds congregate in late summer at Carter Bay, with a maximum daily high count of 413 on 20 July 1995 (Seppi 1995, 1997). North of the delta, ≥100 were found along 20 km of coastline at the mouth of the Koyuk River on 13 June 1976 (Kessel and Gibson 1978).

All other records of large flocks of Hudsonian Godwits in western Alaska are from the delta: 100 on the lower Kashunuk River on 9 August 1966 (Kessel and Gibson 1978), flocks of ≥200 on the north Yukon Delta in mid-July 1977 (refuge files), 200 at Kaghasuk Lake on 11 June 1998 (this study), and 150–200 5 km southwest of Aropuk Lake on 14 August 1998 (this study). We do not know if Hudsonian Godwits congregate annually at these sites, nor do we know if there are additional sites with comparable concen-

trations. Given the vast expanse of the delta and the limited coverage to date, it is not unreasonable to speculate that the delta may support between several hundred and a few thousand breeding and/or migrating birds each year. This would represent a significant fraction of both the Alaska and global populations of the species, which have been estimated at ≤5000–7500 and 50,000 individuals, respectively (Gill and Tibbitts 1999, Brown et al. 2000). Within this context, and using the terminology of Kessel and Gibson (1978), we conclude that Hudsonian Godwits are fairly common migrants, uncommon summer visitants, and rare, perhaps locally uncommon, breeders on the Yukon–Kuskokwim Delta.

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LITERATURE CITED

Alexander, S. A., and Gratto-Trevor, C. L. 1997. Shorebird migration and staging at a large prairie lake and wetland complex: The Quill Lakes, Saskatchewan. Can. Wildlife Serv. Occas. Paper 97.

Andres, B. A., Brann, D. L., and Browne, B. T. 1999. Inventory of breeding birds on local training areas of the Alaska Army National Guard, final report. U. S. Fish and Wildlife Serv., Migratory Bird Management, 1011 E. Tudor Rd., Anchorage, AK 99503.

Brown, S., Gill, R. E., Jr., Gorman, L. Gratto-Trevor, C., Haig, S., Harrington, B., Hunter, C., Morrison, G., Page, G., Sanzenbacher, P., Skagen, S., and Warnock, N. 2000. National shorebird conservation assessment: Shorebird conservation status, conservation units, population estimates, population targets, and species prioritization. Manomet Center for Conservation Sciences, P.O. Box 1770, Manomet, MA 02345.

Gill, R. E., Jr., and Handel, C. M.. 1990. The importance of subarctic intertidal habitats to shorebirds: A study of the central Yukon–Kuskokwim Delta, Alaska. Condor 92:709–725.

Gill, R. E., Jr., and Tibbitts, T. L. 1999. Seasonal shorebird use of intertidal habitats in Cook Inlet, Alaska, Final Report. Biological Resources Division and OCS Study, MMS 99-0012. U. S. Dept. Interior, U. S. Geol. Survey, Alaska Science Center, 1011 E. Tudor Rd, Anchorage, AK 99503.

Grinnell, J. 1910. Birds of the 1908 Alexander Alaska Expedition with a note on the avifaunal relationships of the Prince William Sound district. Univ. Calif. Publ. Zool. 5:361–428.

Hagar, J. A. 1966. Nesting of the Hudsonian Godwit at Churchill, Manitoba. Living Bird 5:5–43.

Haig, S. M., Gratto-Trevor, C. L., Mullins, T. D., and Colwell, M. A. 1997. Population identification of western hemisphere shorebirds throughout the annual cycle. Molec. Ecol. 6:413–427.

Hayman, P., Marchant, J., and Prater, T. 1986. Shorebirds: An Identification Guide to the Waders of the World. Houghton–Mifflin, Boston.

Higgins, P. J., and Davies, S. J. J. F., eds. 1996. Handbook of Australian, New Zealand, and Antarctic Birds, vol. 3. Oxford Univ. Press, Melbourne.

Kessel, B. 1979. Avian habitat classification for Alaska. Murrelet 60:86–94.

Kessel, B. 1989. Birds of the Seward Peninsula, Alaska. Univ. of Alaska Press, Fairbanks.

Kessel, B., and Gibson, D.D. 1978. Status and distribution of Alaska birds. Studies Avian Biol. 1:1–100.

Kincheloe, K. L., and Stehn, R. A. 1991. Vegetation patterns and environmental gradients in coastal meadows on the Yukon–Kuskokwim delta, Alaska. Can. J. Bot. 69:1616–1627.

McCaffery, B. J. 1996. The status of Alaska's large shorebirds: A review and an example. Int. Wader Studies 8:28–32.

Morrison, R. I. G., and Ross, R. K. 1989. Atlas of nearctic shorebirds on the coast of South America. Can. Wildlife Serv. Spec. Publ., Environment Canada, Ottawa.

Piersma, T., and Gill, R. E., Jr. 1998. Guts don't fly: small digestive organs in obese Bar-tailed Godwits. Auk 115:196–203.

Seppi, B. E. 1995. Hudsonian Godwit migration at Carter Spit, Alaska. W. Birds 26:167.

Seppi, B. E. 1997. Fall migration of shorebirds and waterfowl at Carter Spit, Alaska. Open file report 65. U. S. Bureau of Land Management, Alaska State Office, 222 W. 7th Ave., #13, Anchorage, AK 99513.

Tande, G. F., and Jennings, T. W. 1986. Classification and mapping of tundra near Hazen Bay. U. S. Fish and Wildlife Serv., P. O. Box 346, Bethel, AK 99559.

Thorsteinson, L. K., Becker, P. R., and Hale, D. A.. 1989. The Yukon Delta: A synthesis of information. OCS Study, MMS 89-0081. Minerals Management Service, O. C. S. Region, 949 E. 36th Ave., Anchorage, AK 99508-4302.

U. S. Fish and Wildlife Service. 1988. Final comprehensive conservation plan, environmental impact statement, wilderness review, and wild river plan for the Yukon Delta National Wildlife Refuge, Alaska. U. S. Fish and Wildlife Serv., Div. of Refuges, 1011 E. Tudor Rd., Anchorage, AK 99503.

Williamson, F. S. L. 1957. Ecological distribution of birds in the Napaskiak area of the Kuskokwim River Delta, Alaska. Condor 59:317–337.

Williamson, F. S. L., and Smith, M. A. 1964. The distribution and breeding status of the Hudsonian Godwit in Alaska. Condor 66:41–50.

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NESTING OF ASHY STORM-PETRELS AND CASSIN'S AUKLETS IN MONTEREY COUNTY, CALIFORNIA

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ABSTRACT: We report the first known nesting of the Ashy Storm-Petrel and Cassin's Auklet in Monterey County, California, on offshore rocks around Castle Rock and Hurricane Point. Four nests and 13 mist-netted storm-petrels, together with the extent of suitable habitat, suggest a population of 10 to 30 pairs. A single abandoned Cassin's Auklet egg, pink guano, and small numbers of other potential nest sites imply no more than five pairs of that species. Similar small colonies of these species may be scattered on similar offshore rocks along the central California coast, linking the major colonies on the Farallon and Channel islands.

The Ashy Storm-Petrel (*Oceanodroma homochroa*) is nearly endemic as a breeding bird to coastal central and southern California. Most of the world population breeds within two main nesting centers: the South Farallon Islands (San Francisco County) off central California and the California Channel Islands (Santa Barbara, Ventura, and Los Angeles counties) off southern California (Sowls et al. 1980; Carter et al. 1992, unpubl. data; Ainley 1995). The breeding range of the Cassin's Auklet (*Ptychoramphus aleuticus*) extends along the Pacific coast of North America from the Aleutian Islands, Alaska, to northern Baja California Sur, Mexico (AOU 1998). Like the storm-petrel, in California most Cassin's Auklets breed at the South Farallon and Channel islands (Sowls et al. 1980, Carter et al. 1992). Until recently, neither the storm-petrel nor the auklet had been known to nest between these locations, except for recent nesting by small numbers of auklets at Año Nuevo Island, San Mateo County (Thayer et al. 1999). Populations of both species in California are thought to have declined in the last two decades, raising concern particularly for the Ashy Storm-Petrel (Carter et al. 1992, Sydeman et al. 1998).

In 1996 and 1997, we discovered nesting by Ashy Storm-Petrels and Cassin's Auklets on a group of offshore rocks collectively known as the Castle/Hurricane colony complex in coastal Monterey County, California. Our reports of nesting by these species are the first for the county.

STUDY SITE AND METHODS

The Castle/Hurricane colony complex (hereafter, Castle/Hurricane) is located just north of Point Sur, Monterey County, California (Figure 1). This complex of mostly barren offshore rocks and mainland cliffs is composed of three seabird colonies, as defined by Sowls et al. (1980): Bench Mark-227x (BM), Castle Rocks and Mainland (CRM), and Hurricane Point Rocks (HPR).

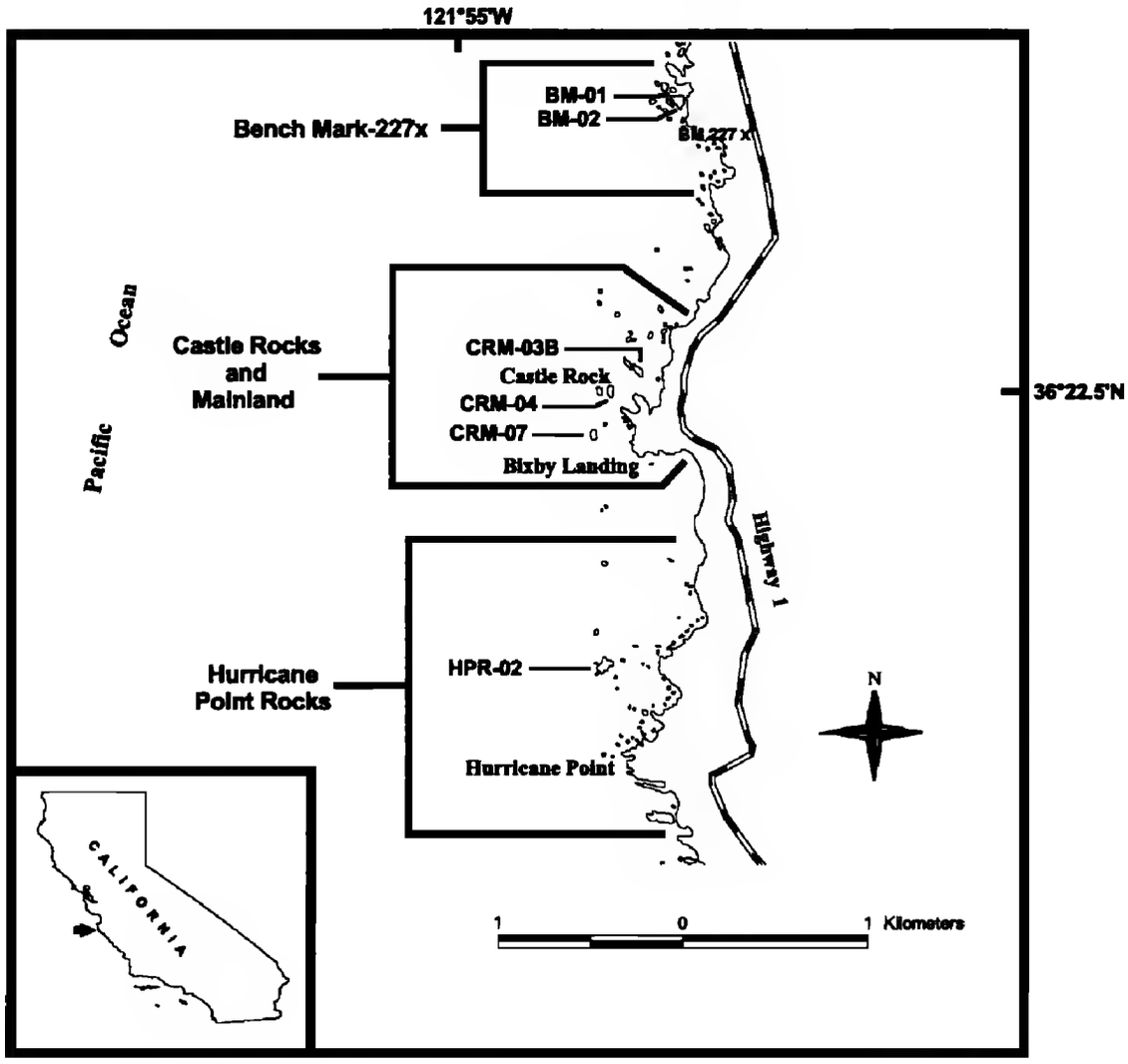

Figure 1. Castle/Hurricane colony complex, Monterey County, California. Abbreviations indicate subcolonies discussed in the text.

The offshore rocks of the complex have been part of the California Islands Wildlife Sanctuary (designated in 1983) and State Ecological Reserve (designated in 1988), managed by the California Department of Fish and Game for the U.S. Bureau of Land Management. In January 2000, the California Islands Wildlife Sanctuary was incorporated into the newly established California Coastal National Monument (P. R. Kelly, Calif. Dept. Fish and Game, pers. comm.). Between 1979 and 1992, seven species of seabirds (two cormorants, one oystercatcher, one gull, and three alcids) were documented nesting or possibly nesting at these colonies, with most birds at CRM and HPR (Sowls et al. 1980, Carter et al. 1992, Roberson and Tenney 1993). In this paper, we refer to the different rocks by their recognized subcolony (or rock) numbers (after Carter et al. 1992, McChesney et al. 1999).

We surveyed for crevice-nesting seabirds at Castle/Hurricane in conjunction with other studies on 20 August 1996 and 2–3 September 1997, after all surface-nesting species had completed breeding activities. Following the discovery of a storm-petrel chick during a low-effort search in 1996, we

surveyed more thoroughly the following year. In 1997, nearly every rock in the colony complex suitable for nesting birds was landed on by at least one person, and accessible areas were searched for potential nesting habitat and nests of crevice-nesting seabirds. Small hand-held flashlights with bright halogen beams were used to illuminate dark crevices.

We mist-netted on the night of 2–3 September 1997 on two rocks: CRM-07 and HPR-02. On CRM-07, a four-tier 7-foot × 30-foot (2.1 × 9.2 m) mist net was stretched east–west across the middle of the rock. On HPR-02, a four-tier 7-foot × 18-foot (2.1 × 5.5 m) mist net was stretched east–west across a broad ledge about a third of the way up the south-facing side of the rock. Mist nets were open from 2026 to 0230 hr on CRM-07 and from 2045 to 0530 hr on HPR-02. Tapes of Ashy Storm-Petrel vocalizations were broadcast from portable cassette players to attract birds to the nets. Each captured bird was marked with a U.S. Geological Survey numbered leg band of incoloy, an alloy resistant to corrosion by salt water. We also examined the condition of the incubation (brood) patch, checked for body, primary, and rectrix molt, measured the lengths of the wing chord, tail, culmen, and tarsus, and recorded body mass. Birds were released immediately following examinations and, in a few cases, photographs were taken.

RESULTS

Ashy Storm-Petrel

On 20 August 1996, we discovered a downy storm-petrel chick in a rock crevice near the top of the west-facing cliff on HPR-02. The chick could not be reached for more thorough examination and species identification. However, from the late date, habitat, and location, we inferred the chick to have been an Ashy (cf. Ainley et al. 1974, Carter et al. 1992). Limited investigations of other rocks and mainland cliffs at Castle/Hurricane revealed petrel-like musky odors around crevices on CRM-07 but no other evidence of storm-petrel or auklet nesting.

On 2 and 3 September 1997, we found four storm-petrel nests at Castle/Hurricane: at BM-01, large shell fragments of one storm-petrel egg; at BM-02, one mostly downy chick; at CRM-03B, one adult incubating an egg; and at HPR-02, one unattended egg on 2 September and one adult incubating the egg on 3 September, in the same crevice as the 1996 nest. Both adults were easily identified as Ashy Storm-Petrels from their size, grayish brown plumage, and lack of a white rump (cf. Ainley 1995). They were not handled to minimize disturbance. Other storm-petrel nests were assumed to be of this species. The chick on BM-02 could not be pulled from its deep, narrow crevice to be examined for identifying marks. Nests on BM-01, BM-02, and HPR-02 were in crevices formed by rock fractures, and the nest on CRM-03B was under a boulder.

On the night of 2–3 September 1997, we captured 13 Ashy Storm-Petrels in mist nets: one on CRM-07, 12 on HPR-02. At CRM-07, wind may have hampered netting, but during the course of the capture period only one other bird was noted flying around the net. The net on HPR-02 was more sheltered from the northwest wind, which may have contributed to the

higher number of captures, although overall activity levels also were higher there. The incubation patches of captured birds indicated that most were breeding: two birds had downy or no patches, four birds had bare patches, and seven birds had refeathering patches. Downy incubation patches indicate nonbreeding birds, bare patches suggest incubating birds, and refeathering patches indicate birds with young (Ainley et al. 1974). Some nonbreeding adults and immature procellariids, however, also may develop a partial or complete incubation patch (Scott 1970, Warham 1990).

Cassin's Auklet

On 2 September 1997 we removed a whole but punctured all-white egg of a Cassin's Auklet from a large crevice set within the west-facing cliff of CRM-07. Cassin's Auklet eggs are larger than the all-white eggs of storm-petrels and smaller than the all-white eggs of the Rhinoceros Auklet (*Cerorhinca monocerata*) and Tufted Puffin (*Fratercula cirrhata*), which also breed in central California. Unfortunately, the egg broke shortly after being first examined and could not be saved for museum preparation. Other possible evidence of nesting by Cassin's Auklets was a crevice on CRM-04 that had pink guano at its entrance. Pink guano often indicates the consumption of euphausiids (Crustacea), a favorite prey item of Cassin's Auklets in California (Hunt et al. 1981, Ainley et al. 1990).

DISCUSSION

These observations documented the first known nesting of the Ashy Storm-Petrel and Cassin's Auklet in Monterey County, California. For the Ashy Storm-Petrel, Castle/Hurricane is the only known nesting location within an approximately 450-km stretch of coast between nesting centers at the South Farallon and Channel islands. For the Cassin's Auklet, this is only the second documented nesting location within that same coastal stretch; the other is the small recently established colony on Año Nuevo Island (Thayer et al. 1999). However, Castle/Hurricane probably is not a newly established colony for these species. Surveys of these nocturnal crevice- or burrow-nesting birds often require special efforts, including climbing and searching potential nesting habitat and mist-netting at night. All previous documented surveys at Castle/Hurricane (e.g., Sowls et al. 1980; Carter et al. 1992; Roberson and Tenney 1993; Parker et al. 1997; McChesney et al. 1999) were conducted from boats, the mainland, or from aircraft and thus were limited to diurnal species.

At Castle/Hurricane, auklets and storm-petrels nest in rock crevices like those at other colonies in central and southern California. Although we found other potential but unoccupied nest sites and did not search all habitats, suitable nesting habitat is not abundant, and populations of these species appear small. A rough estimate of 10 to 30 breeding pairs of Ashy Storm-Petrels is plausible given the numbers of nests and potential nest sites found, the number of mist-net captures, and other likely unsurveyed (i.e., inaccessible) habitat. For the Cassin's Auklet, we estimate one to five pairs in 1997 on the basis of a few potential crevice nest sites. Auklets also dig

burrows for nesting; however, we found very little (if any) soil suitable for burrowing.

The coasts of Monterey and San Luis Obispo counties (as well as other parts of central California) contain many other offshore rocks and cliffs not unlike those at Castle/Hurricane. These areas have yet to be investigated for nocturnal seabirds because of their relative inaccessibility and the potential for detrimental disturbance to surface-nesting species such as Brandt's Cormorant (*Phalacrocorax penicillatus*). Given our findings at Castle/Hurricane, it is likely that small numbers of storm-petrels and auklets breed throughout this area, which may provide some limited connectivity between the major California nesting centers at the South Farallon and Channel islands. More broad-scale surveys are needed if the distributions and abundances of these species in this area are to be better described.

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LITERATURE CITED

Ainley, D. G. 1995. Ashy Storm-Petrel (*Oceanodroma homochroa*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 185. Acad. Nat. Sci., Philadelphia.

Ainley, D. G., Morrell, S., and Lewis, T. J. 1974. Patterns in the life histories of storm petrels on the Farallon Islands. Living Bird 13:295–312.

Ainley, D. G., Strong, C. S., Penniman, T. M., and Boekelheide, R. J. 1990. The feeding ecology of Farallon seabirds, in Seabirds of the Farallon Islands (D. G. Ainley and R. J. Boekelheide, eds.), pp. 51–127. Stanford Univ. Press, Stanford, CA.

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Carter, H. R., McChesney, G. J., Jaques, D. L., Strong, C. S., Parker, M. W., Takekawa, J. E., Jory, D. L., and Whitworth, D. L. 1992. Breeding populations of seabirds in California, 1989–1991. Unpubl. report, U. S. Fish and Wildlife Service, Northern Prairie Wildlife Research Center, 6924 Tremont Rd., Dixon, CA 95620.

Hunt, G. L., Jr., Pitman, R. L., Naughton, M., Winnett, K., Newman, A., Kelly, P. R., and Briggs, K. T. 1981. Reproductive ecology and foraging habits of breeding seabirds, in Summary of marine mammal and seabird surveys of the Southern

California Bight area 1975–1978. Vol. III—Investigators' Reports. Part III. Seabirds—Book II. Publ. PB-81-248-05, U. S. Dept. Commerce, Natl. Tech. Info. Serv., Springfield, VA.

McChesney, G. J., Carter, H. R., Parker, M. W., Capitolo, P. J., Takekawa, J. E., and Yee, J. L. 1999. Population trends and subcolony use of Common Murres and Brandt's Cormorants at the Castle/Hurricane colony complex, California, 1979-1997. Unpubl. report, U.S. Geological Survey, Biological Resources Division, 6924 Tremont Rd., Dixon, CA 95620.

Parker, M. W., McLaren, E. B., Schubel, S. E., Boyce, J. A., Capitolo, P. J., Ortwerth, M. A., Kress, S. W., Carter, H. R., and Hutzel, A. 1997. Restoration of Common Murre colonies in central coastal California: Annual report 1996. Unpubl. report, U.S. Fish and Wildlife Service, San Francisco Bay National Wildlife Refuge Complex, P. O. Box 524, Newark, CA 94560.

Roberson, D., and C. Tenney (eds.). 1993. Atlas of the Breeding Birds of Monterey County, California. Monterey Peninsula Audubon Soc., Carmel, CA.

Scott, D. A. 1970. The breeding biology of the Storm Petrel. Ph. D. dissertation, Oxford Univ., Oxford, England.

Sowls, A. L., DeGange, A. R., Nelson, J. W., and Lester, G. S. 1980. Catalog of California seabird colonies. U.S. Dept. Interior, Fish and Wildlife Service, Biological Services Program. FWS/OBS-80/37.

Sydeman, W. J., Nur, N., McLaren, E. B., and McChesney, G. J. 1998. Status and trends of the Ashy Storm-Petrel on Southeast Farallon Island, California, based upon capture–recapture analyses. Condor 100:438–447.

Thayer, J. A., Harrald, I. E., Hester, M. M., and Sydeman, W. J. 1999. Conservation biology of Rhinoceros Auklets, *Cerorhinca monocerata*, on Año Nuevo Island, California, 1993–1999. Unpubl. report, Point Reyes Bird Observatory, 4990 Shoreline Hwy., Stinson Beach, CA 94970.

Warham, J. 1990. The Petrels: Their Ecology and Breeding Systems. Academic Press, London.

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NESTING WATERBIRDS ON ISLAS SAN MARTIN AND TODOS SANTOS, BAJA CALIFORNIA

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ABSTRACT: A survey of Isla San Martin on 2 June 1999 revealed about 30 Brown Pelican, 600 Double-crested Cormorant, and over 300 occupied Western Gull nests, plus a mixed pair of oystercatchers. Thus the Double-crested Cormorant has reoccupied what was once its largest colony in North America. Surveys of Islas Todos Santos on 3 June 1999 and 27 March 2000 revealed 115 Double-crested Cormorant and at least 184 occupied Brandt's Cormorant nests, plus about 1400 nesting pairs of Western Gulls. On Todos Santos, at least two nests of the Pelagic Cormorant represent a southward extension of that species' breeding range, whereas two nesting pairs of the Reddish Egret represent a northward extension.

During the late 1960s and early 1970s several fish-eating bird species experienced decreases in breeding success, and hence severe population declines, due to eggshell thinning caused by organochlorine ingestion (Keith et al. 1971, Risebrough et al. 1971, Jehl 1973, Anderson et al. 1975, Anderson and Gress 1983, Gress 1995). After use of DDT was curtailed in the early 1970s some species, like the Brown Pelican (*Pelecanus occidentalis*), started to recover in the late 1970s (Jehl 1984, Anderson et al. 1996).

Despite the reduction in organochlorine pollution, human disturbance on islands still threatens seabird nesting colonies in northwestern Mexico (Anderson and Keith 1980, Anderson 1988). Human disturbance on islands has increased steadily as tourism, scientific and educational expeditions, sport-fishing, outdoor activities, and commercial harvest of marine resources have developed (Velarde and Anderson 1994). Since people visit islands that are near shore more often than distant ones, continuous human-induced effects are expected to be greatest on islands closest to the mainland (Burger and Gochfeld 1994). On islands, human disturbance usually occurs close to fishing camps and/or landing sites. The extreme sensitivity of Brown Pelicans and cormorants to human disturbance can limit the available suitable nesting habitat for these birds (Anderson 1988, Everett and Anderson 1991).

At least since 1913 (Wright 1913), and until the late 1960s (Jehl 1973), Isla San Martín supported a large mixed colony of Brown Pelicans, Double-crested Cormorants (*Phalacrocorax auritus*), and Brandt's Cormorants (*P. penicillatus*). Indeed, the breeding colony of Double-crested Cormorants was considered the largest in North America (Gress et al. 1973, Everett and Anderson 1991, Carter et al. 1995). Disturbance by tourists has been suggested as the major factor in the demise of the seabird colonies on this island (Anderson and Keith 1980, Jehl 1973, 1984).

The objective of this note is to contribute to the knowledge of the status of nesting waterbirds on islas San Martín and Todos Santos by reporting our observations during visits to each island in June 1999. San Martín was surveyed on 2 June, Todos Santos on 3 June. Our trip was aboard the trimaran

Alguita, of the Algalita Foundation. An additional visit to Todos Santos was made on 27 March 2000.

SPECIES ACCOUNTS

Brown Pelican (*Pelecanus occidentalis*)

San Martín: Wright (1913), first, reported "nesting in considerable numbers on the southern shores" of the island. During a boat survey clockwise around the island, we counted 30 Brown Pelicans nesting on the northwestern side of the island. They were in two groups along the edge of sand dunes, among Double-crested Cormorants. From the ground, we observed five additional nests among a subcolony of 200 Double-crested Cormorants nearby. The pelicans on the latter nests were incubating, as evidenced by their red gular pouches; one pelican was observed turning eggs. One individual was a subadult (3 years old; Schreiber et al. 1989). Nesting here was late in comparison with that at pelican colonies in the Gulf of California, several of which had large young at the same time as our Pacific islands survey (pers. obs.). The presence of at least one subadult and the lateness of eggs suggest that this colony might be of recent establishment or is still growing. As we could not make a later visit, we were unable to gauge the colony's productivity. In May 2000 there were several thousand Brown Pelicans on San Martín, and several nests, some of them with eggs, were visible from a distance, (J. A. Sánchez-Pacheco pers. comm.).

Todos Santos: Pelicans nested here in the past (Howell 1912, Van Denburgh 1924), but there are no recent records (Everett and Anderson 1991). We saw only a few nonbreeding individuals flying around both Todos Santos islands.

Double-crested Cormorant (*Phalacrocorax auritus*)

San Martín: Wright (1913) estimated close to 350,000 nests here. Although this figure is likely an overestimate (Carter et al. 1995), the colony was certainly the largest of this species in North America. The breeding area, Wright wrote, "reaches inland a half mile on all sides." In 1969 and 1971 the colony numbered approximately 5000 and appeared to have no reproductive problems (Gress et al. 1973). In 1987 and 1988 Everett noted "up to a dozen recently completed but unoccupied nests on the west side of the island" (Everett and Anderson 1991) and suggested this colony was nearly, if not totally, abandoned. A few dozen Double-crested Cormorants were nesting on the western side of the island 7–9 July 1989 (Mellink pers. obs.). Carter et al. (1995) considered the colony abandoned.

We found 600 occupied cormorant nests, all on the western side of the island, in the same area as in 1989. This is an area of sand dunes, in which most of the nests were on frutilla (*Lycium* sp.) shrubs, although some nests were on the bare ground. We estimated at least 800 unoccupied ancient and abandoned cormorant nests at higher elevations, within the same area.

Todos Santos: These islands have been used continually by Double-crested Cormorants since, at least, the turn of the 20th century (Howell 1912, Van Denburgh 1924, Everett and Anderson 1991, Mellink and Palacios unpubl. data). In 1999 we found 115 occupied nests, more than in the late 1970s and early 1980s (Everett and Anderson 1991). Most of the nests had eggs, some had chicks (3 nests with 2 chicks, 1 nest with 3 chicks). We counted a total of 150 adults and young at the nesting site.

Brandt's Cormorant (*Phalacrocorax penicillatus*)

San Martín: On his visit, on 5 July 1913, Wright (1913) reported "several thousand Brandt's cormorants, which had left their nests and were standing around in droves." On 18 February 1977, K. Garrett (pers. comm.) noted an inactive "dense colony of old cormorant nests atop *Lycium* shrubs on north slope of volcano," and Everett and Anderson (1991) considered the large colony abandoned. We found no evidence of current breeding on the island.

Todos Santos: Nesting has occurred here for at least 90 years (Howell 1912, Van Denburgh 1924, Everett and Anderson 1991). We estimated at least 184 occupied nests, mostly with eggs, but nine had chicks. We counted 435 adults and young at the nesting sites. Nesting was restricted to sea-facing cliffs and rocks offshore.

Pelagic Cormorant (*Phalacrocorax pelagicus*)

Todos Santos: On 27 March 2000 there were at least two Pelagic Cormorants on nests on Todos Santos' northern island. They were near the top of the cliffs that fall to the sea on the northeastern side of the island. Pelagic Cormorants have nested on this island probably for many years, as they were recorded on 10 April 1967 (Jehl in Wilbur 1987), 12 February 1977, and 4 February 1979 (Garrett in Wilbur 1987). Regarding the 10 April 1967 record, J. Jehl (in litt. to Richard Erickson) states "saw 10–15 Pelagic Cormorants but found no nests. So late in the year, however, that they were probably there somewhere." This island is the southermost known breeding locality for this species.

Brown Booby (*Sula leucogaster*)

Todos Santos: On 27 March 2000 there was one male Brewster's Brown Booby (*S. l. brewsteri*) displaying courtship behavior among several Western Gulls. Brown Boobies have been found on other occasions in the area. Ron LeValley (in litt. to Richard Erickson) saw three Brown Boobies at Todos Santos on 27 January 1993. In April 1999, six Brown Boobies were reported on Islas Los Coronados off Tijuana (McCaskie 1999).

Reddish Egret (*Egretta rufescens*)

Todos Santos: We observed two pairs engaged in breeding activities on the southern island. The four individuals were in breeding plumage, and two of them (presumably the males) were carrying nest materials to their mates, which were building nests. One pair was also performing courtship displays. Nesting substrate was Velvet Cactus (*Bergerocactus emory*) mixed with Lemonadeberry (*Rhus integrifolia*), about 20 meters from the nearest Western Gull (*Larus occidentalis*) nest. On 27 March 2000, two Reddish Egrets were standing on the same bushes of the 1999 nesting.

No previous record of this species exists for the island (Kaeding 1905, Howell 1912, Van Denburgh 1924). Indeed, Wilbur (1987) indicated that on the western coast of Baja California it is an uncommon resident south of Guerrero Negro, being found only occasionally north into Upper California. Grinnell (1928) and Massey and Palacios (1994) listed San Quintín as the most northerly location for this

species' residency along the Pacific coast of Baja California. Von Bloeker and Harter (1928), however, reported a Reddish Egret in the midst of a Brown Pelican colony on Islas Los Coronados on 6 May 1928. Presumably no one considered that this individual could have been nesting.

American and Black Oystercatchers
(*Haematopus palliatus* and *H. bachmani*)

On the Pacific side of Baja California, including the coastal islands, the American Oystercatcher is reported to be a resident as far north as Isla San Gerónimo, whereas the Black Oystercatcher is a resident from Punta Abreojos north (Wilbur 1987). They are known to interbreed within their area of overlap (Kenyon 1949, Jehl 1985, Wilbur 1987). On San Martín we found a pair formed by one individual of each species. They behaved as a breeding pair and exhibited distraction behavior. However, we could not find a nest. Nesting by hybrid pairs has been suspected in the Channel Islands and, from the number of birds showing intermediate characteristics, must be widespread in southern California and northern Baja California (R. Erickson pers. comm.). On Todos Santos we found three pairs of the Black Oystercatcher, but we did not search for nests.

Western Gull (*Larus occidentalis*)

This is the most ubiquitous marine bird along the Pacific coast of Baja California, nesting on almost all islands (Everett and Anderson 1991, Grinnell 1928).

San Martín: We counted over 300 pairs nesting. Nesting was restricted to the western side of the island, adjacent to and above the Double-crested Cormorant–Brown Pelican colony. We examined eight nests: four had two eggs, four had three.

Todos Santos: On the southern island we estimated 2550 Western Gulls (about 1300 pairs). We estimated about 100 breeding pairs on the northern island. On the southern island we examined 35 nests: 16 had eggs, 19 had chicks. Of the nests with eggs, two had one egg, five had two, eight had three, and one had four (mean 2.5 eggs per nest). Of the nests with chicks, three had one chick, nine had two, and seven had three (mean 2.21 chicks per brood). We saw over 15 well-maintained (i.e., active) nests that were empty, suggesting that some chicks were hiding outside their nests. Some fledglings were already dispersing, and we saw one young of the year on the coast at Ensenada.

DISCUSSION

During our visit to Isla San Martín it was evident that fishing and kelp cropping were at a minimum, and only a few fishermen were living on the island. Disturbance to the western side of the island is likely to have been minimal. Although feral cat sign was abundant and widespread, cats probably do not pose a significant theat to pelicans or cormorants (Anderson et al. 1989). The large colony of Double-crested Cormorants and the presence of a breeding colony of Brown Pelicans clearly shows

the island is capable of supporting large colonies of both these species, and perhaps Brandt's Cormorants as well. We believe that a minimum of management could ensure the health of these colonies.

What the nesting of Reddish Egrets on Todos Santos represents is a puzzle, and only further monitoring will clarify the nesting status of this species in northwestern Baja California.

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LITERATURE CITED

Anderson, D. W. 1988. Dose–response relationship between human disturbance and Brown Pelican breeding success. Wildlife Soc. Bull. 16:339–345.

Anderson, D. W., and Gress, F. 1983. Status of a northern population of California Brown Pelicans. Condor 85:79–88.

Anderson, D. W., and Keith, J. O. 1980. The human influence on seabird nesting success: Conservation implications. Biol. Conserv. 18:65–80.

Anderson, D. W., Jehl, J. R., Risebrough, R. W., Woods, L. A., Deweese, L. R., and Edgecomb, W. G. 1975. Brown Pelicans: Improved reproduction off the southern California coast. Science 193:806–808.

Anderson, D. W., Gress, F., and Fry, M. 1996. Survival and dispersal of oiled Brown Pelicans after rehabilitation and release. Mar. Poll. Bull. 32:711–718.

Anderson, D. W., Keith, J. O., Trapp, G. R., Gress, F., and Moreno, L. A. 1989. Introduced ground predators in California Brown Pelican colonies. Colonial Waterbirds 12:98–103.

Burger, J., and Gochfeld, M. 1994. Predation and effects of humans on island-nesting seabirds. BirdLife Cons. Ser. 1:39–67.

Carter, H. R., Sowls, A. L., Rodway, M. S., Wilson, U. W., Lowe, R. W., McChesney, G. J., Gress, F., and Anderson, D. W. 1995. Population size, trends, and conservation problems of the Double-crested Cormorant on the Pacific coast of North America. Colonial Waterbirds 18 (Spec. Publ. 1): 189–215.

Everett, W. T., and Anderson, D. W. 1991. Status and conservation of the breeding seabirds on offshore Pacific islands of Baja California and the Gulf of California. Int. Council Bird Protection Tech. Publ. 11:115–139.

Gress, F. 1995. Organochlorines, eggshell thinning, and productivity relationships in Brown Pelicans breeding in the Southern California Bight. Ph.D. dissertation, Univ. Calif., Davis.

Gress, F., Risenbrough, R. W., Anderson, D. W., Kiff, L. F., and Jehl, J. R. 1973. Reproductive failures of Double-crested Cormorants in southern California and Baja California. Wilson Bull. 85:197–208.

Grinnell, J. 1928. A distributional summation of the ornithology of Lower California. Univ. Calif. Publ. Zool. 32:1–300.

Howell, A. B. 1912. Notes from Todos Santos Islands. Condor 14:187–191.

Jehl, J. R., Jr. 1973. Studies of a declining population of Brown Pelicans in northwestern Baja California. Condor 75:69–79.

Jehl, J. R., Jr. 1984. Conservation problems of seabirds in Baja California and the Pacific Northwest. Int. Council Bird Protection Tech. Publ. 2:41–48.

Jehl, J. R., Jr. 1985. Hybridization and evolution of oystercatchers on the Pacific coast of Baja California. Ornithol. Monogr. 36:484–504.

Kaeding, H. B. 1905. Birds from the west coast of Lower California and adjacent islands. Condor 7:105–111.

Keith, J. O., Woods, L. A., and Hunt, G. 1971. Reproductive failure in Brown Pelicans on the Pacific coast. Trans. N. Am. Wildlife Nat. Resource Conf. 35:56–63.

Kenyon, K. W. 1949. Observations on behavior and populations of oystercatchers in Lower California. Condor 51:193–199.

Massey, B. W., and Palacios, E. 1994. Avifauna of the wetlands of Baja California, México: Current status. Studies Avian Biol. 15:45–57.

McCaskie, G. 1999. Southern Pacific coast region. N. Am. Birds 53:328–331.

Risebrough, R. W., Sibley, F. C., and Kirven, M. N. 1971. Reproductive failure of the Brown Pelican on Anacapa Island in 1969. Am. Birds 25:8–9.

Schreiber, R. W., Schreiber, E. A., Anderson, D. W., and Bradley, D. W. 1989. Plumages and molts of Brown Pelicans. Nat. Hist. Mus. Los Angeles Co. Contr. Sci. 402:1–43.

Van Denburgh, J. 1924. The birds of Todos Santos Islands. Condor 26:67–71.

Velarde, E., and Anderson, D. W. 1994. Conservation and management of seabird islands in the Gulf of California: Setbacks and successes, in Seabirds on Islands: Threats, Case Studies and Action Plans (D. N. Nettleship, J. Burger, and M. Gochfeld, eds.), pp. 721–767. Int. Council Bird Preserv., Cambridge, England.

Von Bloeker, J. C., and Harter, S. G. 1928. Reddish Egret on Los Coronados Islands, Mexico. Condor 30:253.

Wilbur, S. R. 1987. Birds of Baja California. Univ. of Calif. Press, Berkeley.

Wright, H. W. 1913. The birds of San Martín Island, Lower California. Condor 15:207–210.

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TWO SUBSPECIES OF WARBLING VIREO DIFFER IN THEIR RESPONSES TO COWBIRD EGGS

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ABSTRACT: Using real cowbird eggs, we experimentally parasitized 41 nests of the Warbling Vireo (*Vireo gilvus*), three each in British Columbia and Colorado, five in Montana, and 30 in Manitoba, and recorded whether the cowbird eggs were accepted or rejected. Cowbird eggs were accepted at all nests tested in British Columbia and Colorado, but both acceptance and rejection were recorded in Montana. In Manitoba, all cowbird eggs were rejected (29 by puncture-ejection, one by desertion). The results suggest acceptance by a western subspecies of the Warbling Vireo, *V. g. swainsonii*, and rejection by the eastern subspecies, *V. g. gilvus*. The geographic variability in acceptance/rejection agrees with suggested taxonomic differences for the Warbling Vireo, i.e., that there are two species and that neither appears to vary in response to the presence of cowbird eggs in its nests.

Species of birds that suffer reduced reproductive success when parasitized by Brown-headed Cowbirds (*Molothrus ater*) should evolve strategies that reduce or eliminate the costs of parasitism, especially because cowbird eggs are distinguishable from the eggs of most host species. Adaptations for rejection of parasitic eggs from nests have evolved in some species, but most species accept cowbird eggs (Rothstein 1975, 1990). Why only a few species reject cowbird eggs has been attributed to the duration of exposure to the selective pressure of cowbird parasitism (Rothstein 1975) or constraints on the ability of small hosts to eject cowbird eggs from the nest (Rohwer and Spaw 1988). Among the ejecter species, the larger ones grasp and remove cowbird eggs with their bills, whereas the smaller species puncture-eject them (Rohwer and Spaw 1988).

Recently, Sealy (1996) determined experimentally that the Warbling Vireo (*Vireo gilvus*) removes cowbird eggs from its nests. At 15 g, it is the smallest species in North America known to do so (Sealy 1996). This species' responses to cowbird eggs also appear to vary across its geographic range. A literature survey of the frequency of parasitism in various populations of Warbling Vireos (table 2 of Sealy 1996) revealed that 0 to 11% of Warbling Vireo nests were parasitized in populations within and east of the Central Great Plains, whereas 50 to 70% of nests were parasitized in populations west of the Great Plains. Where experimental data are lacking, Friedmann et al. (1977) assumed that a species accepts cowbird eggs (i. e., is an accepter) if 20% or more of its nests are recorded parasitized. Under this definition, western populations of the Warbling Vireo would be classified as accepters, whereas central and eastern populations reject parasitism. Sealy's (1996) experiments on Warbling Vireos in Manitoba support the assessment of birds there as rejecters.

From those data, Sealy (1996) concluded that the apparent geographic variation in response to parasitism by Warbling Vireos generally fits with data regarding the duration of sympatry with cowbirds by eastern versus western populations (Mayfield 1965, Rothstein 1994, but see Ward and Smith 1998). Experiments on populations across the breeding range of the Warbling Vireo are required to confirm the extent of responses to cowbird eggs. Here we present the results of tests on nests of the Warbling Vireo in British Columbia, Colorado, Montana, and Monitoba.

METHODS

We experimentally parasitized Warbling Vireo nests at four localities, described by Ward and Smith (2000), Marvil and Cruz (1989), MacKenzie et al. (1982), and Tewksbury et al. (1998). British Columbia: In 1994, David Ward parasitized one nest about 7 km WNW of Oliver (49° 10′ N, 119° 13′ W) and two nests 7 km E of Okanagan Falls (49° 21′ N, 119° 33′ W), in the southern Okanagan Valley. Montana: Banks tested five nests in 1996, two along the Bitterroot River (45° 56′ N, 114° 08′ W and 46° 07′ N, 114° 10′ W), three along Rock and Lick creeks (45° 09′ N, 114° 13′ W) and McCoy Creek (45° 59′ N, 114° 12′ W). One of these nests was naturally parasitized, receiving one cowbird egg. Colorado: In 1994, Chace tested two nests and recorded the response to a naturally laid cowbird egg in another nest, all in Boulder County. One nest was near Ward on the Sawtooth Springs Ranch (40° 07′ N, 105° 28′ W), the others were on Flagstaff Mountain (40° 00′ N, 105° 18′ W). Manitoba: Sealy (1996) parasitized 16 nests and recorded the response to natural parasitism at one nest in 1992 and 1993 at Delta Marsh (50° 11′ N, 98° 19′ W). He tested 13 additional nests in 1996 and 1997, for a total of 30 nests at this site.

We introduced one real cowbird egg into each nest during the laying stage or incubation stage. In all but one nest, cowbird eggs were added before 12:00 (respective standard times). A host egg was not removed from nests because egg removal by cowbirds is variable (Sealy 1992). Most nests were inspected the day after parasitism and every day after that until the cowbird egg disappeared or had remained in the nest for at least 5 days, when it was assumed to be accepted (Rothstein 1975, Sealy 1996). We watched all nests tested in Colorado and Montana and 17 nests in Manitoba for 30 to 60 min immediately following parasitism to record reactions of adults to the parasitized clutches (see Sealy 1996 for descriptions of behavioral responses to experimental parasitism in Manitoba).

RESULTS

Cowbird eggs were accepted at all nests tested in British Columbia (n = 3, D. Ward, pers. comm.) and in Colorado (n = 3). One of these nests was naturally parasitized, receiving one cowbird egg. In Montana, cowbird eggs were accepted at three nests (one experimentally parasitized during laying; two during incubation, one clutch already parasitized) and ejected from two incubated clutches.

Reactions of females upon their return to the parasitized nests differed. In Manitoba, at 16 nests where an adult returned to the nest during the observation, the vireo punctured or broke the cowbird egg and ejected it, generally within seconds of its return to the nest (description of behavior in Sealy 1996). At the three Colorado nests, vireos returned unagitated and settled on their eggs without probing or pecking the cowbird egg or behaving in any other way that suggested recognition of the foreign egg. Vireos also resumed incubation at the five Montana nests with no signs of recognition of the cowbird eggs, although the cowbird eggs were later ejected at two nests.

DISCUSSION

Warbling Vireos' responses at experimentally parasitized nests varied. Cowbird eggs were accepted at all nests tested in British Columbia and Colorado but were rejected from all nests tested in Manitoba. In Montana, cowbird eggs were accepted at three and ejected from two nests. Collectively, these results are subject to two interpretations. The first is that acceptance and rejection behavior in the Warbling Vireo is variable and that therefore this species joins a small group of species in which acceptance or rejection is not near 100%, such as the Yellow-breasted Chat (*Icteria virens*, Burhans and Freeman 1997), Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*, Dufty 1994), and Common Grackle (*Quiscalus quiscula*, Peer and Bollinger 1997). The other interpretation is that despite the variable responses to parasitism, Warbling Vireos do not conflict with the generalization of low variation in responses because the Warbling Vireo as traditionally constituted is actually two sibling species (Johnson et al. 1988, Sibley and Monroe 1990, Murray et al. 1994).

Sibley and Monroe (1990) recognized two species of Warbling Vireo, *Vireo gilvus* (Eastern Warbling-Vireo) and *V. swainsonii* (Western Warbling-Vireo). The species differ in morphology and vocalizations (J. C. Barlow in Sibley and Monroe 1990) and by about 3% sequence divergence in their mitochondrial DNA (Murray et al. 1994). At one point where their ranges meet, in north-central Alberta, males singing the *gilvus* song-type and males singing the *swainsonii* song-type have been found on adjacent territories, but interbreeding between the two has not been recorded (W. B. McGillivray and J. C. Barlow pers. comm.). Although the limits of the ranges of the eastern and western subspecies of the Warbling Vireo are known only roughly (e.g. Sibley 1940, Worthen 1969, Browning 1974, Voelker and Rohwer 1998), we suspect the two subspecies, or species, meet also in western Montana (see maps in Voelker and Rohwer 1998) because both acceptance and rejection of cowbird eggs were recorded there. Confirmation of the trend toward acceptance of cowbird eggs in a western subspecies and rejection by the eastern one, suggested by our limited data, requires more testing of nests across the entire range of the Warbling Vireo, especially of birds farther east and preferably with the attendant species or subspecies verified at each nest.

The variable response to parasitism supports the contention of two species of Warbling Vireo, with *swainsonii* occurring from the Rocky Mountains to the Pacific Ocean and *gilvus* from the Rockies to northeastern

North America. As cowbirds were found historically from the Rockies to the eastern slopes of the Sierra Nevada and Cascade Range (Rothstein 1994), *swainsonii* is likely to have experienced some parasitism before the cowbird's range extensions since 1900. But the critical thing in *gilvus* being a rejecter is that it likely experienced extensive parasitism in and adjacent to the Great Plains. Sealy (1996) assumed that *swainsonii*, though smaller than *gilvus* (Ridgway 1904), is large enough not to be physically constrained from ejecting cowbird eggs. If not, and rejection is more costly, these individuals may be in equilibrium with cowbird parasitism. This seems unlikely, however, because the usual result of parasitism on Warbling Vireos is the loss of their entire brood (references in Sealy 1996). Therefore, there may be essentially no cost to rejection, only a reduction in the net value of not rejecting cowbird eggs.

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LITERATURE CITED

Browning, M. R. 1974. Taxonomic remarks on recently described subspecies of birds that occur in the northwestern United States. Murrelet 55:32–38.

Burhans, D. E., and Freeman, P. C. 1997. Partial rejection of immaculate foreign eggs by Yellow-breasted Chats. Auk 114:503–506.

Dufty, A. M., Jr. 1994. Rejection of foreign eggs by Yellow-headed Blackbirds. Condor 96:799–801.

Friedmann, H., Kiff, L. F., and Rothstein, S. I. 1977. A further contribution to knowledge of the host relations of the parasitic cowbirds. Smithsonian Contr. Zool. 235:1–75.

Johnson, N. K., Zink, R. M., and Marten, J. A. 1988. Genetic evidence for the relationships in the avian family Vireonidae. Condor 90:428–445.

MacKenzie, D. I., Sealy, S. G., and Sutherland, G. D. 1982. Nest-site characteristics of the avian community in the dune-ridge forest, Delta Marsh, Manitoba: A multivariate analysis. Can. J. Zool. 60:2212–2223.

Marvil, R. E., and Cruz, A. 1989. Impact of Brown-headed Cowbird parasitism on the reproductive success of the Solitary Vireo. Auk 106:476–480.

Mayfield, H. F. 1965. The Brown-headed Cowbird, with old and new hosts. Living Bird 4:13–28.

Murray, B. W., McGillivray, W. B., Barlow, J. C., Beech, R. N., and Strobeck, C. 1994. The use of cytochrome *b* sequence variation in estimation of phylogeny in the Vireonidae. Condor 96:1037–1054.

Peer, B. D., and E. K. Bollinger. 1997. Explanations for the infrequent cowbird parasitism on Common Grackles. Condor 99:151–161.

Ridgway, R. 1904. The birds of North and Middle America. Bull. U. S. Natl. Mus. 50, part 2.

Rohwer, S., and Spaw, C. D. 1988. Evolutionary lag versus bill-size constraints: A comparative study of the acceptance of cowbird eggs by old hosts. Evol. Ecol. 2:27–36.

Rothstein, S. I. 1975. An experimental and teleonomic investigation of avian brood parasitism. Condor 77:250–271.

Rothstein, S. I. 1990. A model system for coevolution: Avian brood parasitism. Annu. Rev. Ecol. Syst. 21:481–508.

Rothstein, S. I. 1994. The cowbird's invasion of the far west: History, causes and consequences experienced by host species, in A century of avifaunal change in western North America (J. R. Jehl, Jr. and N. K. Johnson, eds.). Studies Avian Biol. 15:301–315.

Sealy, S. G. 1992. Removal of Yellow Warbler eggs in association with cowbird parasitism. Condor 94:40–54.

Sealy, S. G. 1996. Evolution of host defenses against brood parasitism: Implications of puncture-ejection by a small passerine. Auk 113:346–355.

Sibley, C. G. 1940. The Warbling Vireo of the cape district of Lower California. Condor 42:155–158.

Sibley, C. G., and Monroe, B. L., Jr. 1990. Distribution and Taxonomy of Birds of the World. Yale Univ. Press, New Haven, CT.

Tewskbury, J. J., Hejl, S. J., and Martin, T. E. 1998. Breeding productivity does not decline with increasing fragmentation in a western landscape. Ecology 79:2890–2903.

Voelker, G., and S. Rohwer. 1998. Contrasts in scheduling of molt and migration in Eastern and Western warbling-vireos. Auk 115:142–155.

Ward, D, and Smith, J. N. M. 2000. Inter-habitat differences in parasitism frequencies by Brown-headed Cowbirds in the Okanagan Valley, British Columbia, in Ecology and management of cowbirds: Studies in the conservation of North American passerine birds (J. N. M. Smith, T. L. Cook, S. I. Rothstein, S. K. Robinson, and S. G. Sealy, eds.), pp. 210–219. Univ. of Tex. Press, Austin.

Ward, D., and Smith, J. M. N. 1998. Morphological differentiation of Brown-headed Cowbirds in the Okanagan Valley, British Columbia. Condor 100:1–7.

Worthen, G. L. 1969. Does *Vireo gilvus swainsonii* occur in Utah? Great Basin Nat. 29:181–182.

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NOTES

BREEDING BIRDS OF THE GUERRERO NEGRO SALTWORKS, BAJA CALIFORNIA SUR, MEXICO

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Ojo de Liebre (Scammon's) Lagoon, on the west coast of the Baja California peninsula, is surrounded by saltmarshes and saltflats exposed to periodic tidal inundation. Part of these areas was modified in 1956 by the building of saltworks, a system of managed ponds covering 27,773 ha. These ponds contain several islands, sand bars, and sand flats suitable for nesting birds (Figure 1). In 1996 we surveyed the saltwork's nesting birds, as part of a year-round study (Carmona and Danemann 1998).

These saltworks lie next to Ojo de Liebre Lagoon and south of Guerrero Negro, a small industrial town in the northwestern portion of the state of Baja California Sur, in Mexico (Figure 1). The salt-production process involves the pumping of sea water from the lagoon into a system of concentration ponds, where it evaporates through the action of the sun and wind. Water levels and salinity are kept fairly stable at all times, as a requirement for the process.

The area, which is part of El Vizcaíno Reserve of the Biosphere, is concessioned to Exportadora de Sal S.A.C.V., a joint venture of the Mexican government and a foreign corporation. All access to the area is restricted, and occasional visitors are escorted in company vehicles. As a result, the saltwork is the only portion of the reserve to receive effective protection from human intrusion.

The birds of Ojo de Liebre Lagoon have been studied since 1927. Massey and Palacios (1994) reported 15 species breeding in the lagoon, 13 of which had been previously observed by Bancroft (1927). Other reports for the area (Kenyon 1947a,b, 1949, Castellanos et al. 1994, and Castellanos and Ortega 1995) made no additions to the list of birds breeding in the lagoon.

We performed 12 monthly censuses in the saltworks, from December 1995 to December 1996; there was no census in October. During censuses we carried out detailed inspections of all areas suitable for nesting, by foot and/or using binoculars (8× and 10×) and a spotting scope (15–60×). Sand bars and sand flats were reached by road, while a motor boat was used to visit islands in areas S1-A, 8, and 9 (Figure 1). The poor condition of some of the pathways and dikes made visiting the coast to the south and east of the concentration ponds impossible. Each survey required two days, covering 18,117 ha, equivalent to 65.2% of the saltworks. We recorded ten species breeding in the saltworks.

Osprey (*Pandion haliaetus*). We recorded 24 active nests, 20 of them built on artificial platforms, three on other structures (tank tower, power post, and lighthouse tower), and one on *Salicornia* bushes. Ten nests were located on the road to El Chaparrito channel (including the one on *Salicornia* bushes), 13 along the channel, and one in the Salitrales pumping station, in a post right over the pumps. The birds' breeding season here in 1996 extended from January to June, with the highest number of active nests observed during March (24 nests). From their survey of the lagoon and the saltworks, Castellanos and Ortega (1995) reported a total of 126

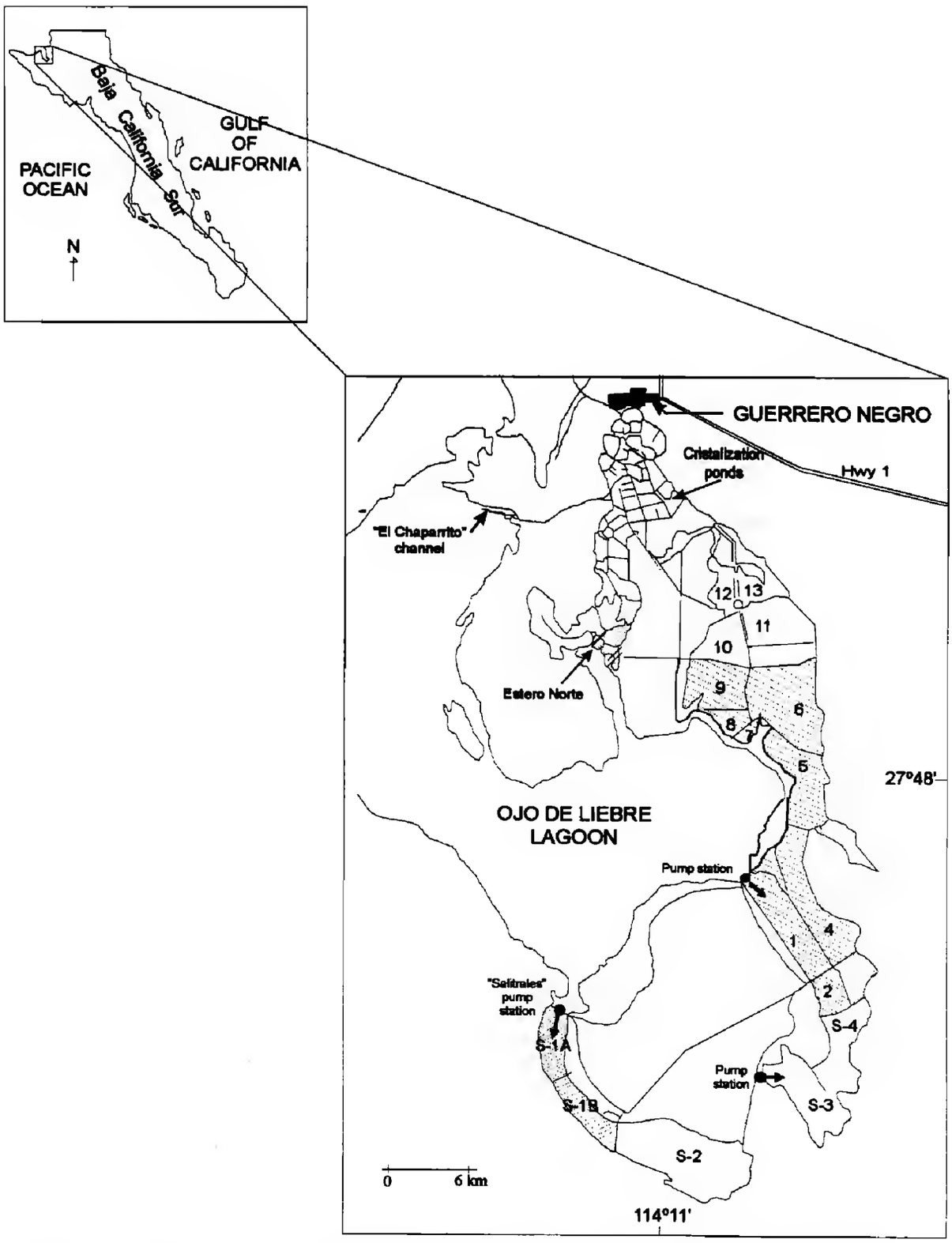

Figure 1. Saltworks next to Ojo de Liebre Lagoon, Baja California Sur, México. The evaporation ponds are indicated by numbers. The ponds visited during this study are shaded.

pairs, 13 of them within the saltworks. According to those figures and our own data, the saltworks hold between 10 and 19% of the local breeding population.

Peregrine Falcon (*Falco peregrinus*). We observed one nest, active in March and April, on a light tower in El Chaparrito channel. The same nest was noted by Castellanos et al. (1994) in 1993. This species is enlisted as endangered by Mexican law (Gobierno de los Estados Unidos Mexicanos 1994).

Snowy Plover (*Charadrius alexandrinus*). We found two nests (each one with one egg) in June, on a sand flat beside Area 1. There may have been more, since we saw at least 20 adults in the area. Additionally, in August we found three chicks on another sand flat, beside Area 8. The Snowy Plover is a common resident on both coasts of the peninsula, nesting on sandy beaches between March and July (Wilbur 1987, Howell and Webb 1995), and was reported nesting previously in the saltworks by Massey and Palacios (1994).

American Oystercatcher (*Haematopus palliatus*). We found one nest with two eggs in April, on a sand bar in Area 8. This species is a common resident on both coasts of the peninsula (Wilbur 1987, Howell and Webb 1995) and has been long reported as a breeder in the area (Bancroft 1927, Kenyon 1949).

Gull-billed Tern (*Sterna nilotica*). We found four nests and seven adults in June, on a sandy islet in Area S1-A. Each nest contained two eggs. The nests consisted of shallow hollows in the sand, and all of them contained pieces of shell. We saw no nesting activity in July, suggesting that breeding might not have been successful. This is the first breeding record for the species in the Baja California peninsula. The closest Gull-billed Tern colony is located in the Gulf of California on Montague Island, in the Colorado river delta, 500 km north of Guerrero Negro (Palacios and Mellink 1992, Peresbarbosa 1995).

Caspian Tern (*Sterna caspia*). This species nested in two areas of the saltworks. One was on a sandy islet in Area 8, which in June had 15 nests (13 of them with only one egg). In July this colony was abandoned. The other colony shared an islet in Area S1-A with the Gull-billed Terns. In June, this colony had 37 nests containing from one egg to newly hatched nestlings, while in July it held 20 active nests and 23 well-developed nestlings. The Caspian Tern was reported previously nesting in Ojo de Liebre lagoon by Bancroft (1927) and in these saltworks by Massey and Palacios (1994).

Royal Tern (*Sterna maxima*). We found the first nests of this species in May, sharing a sandy islet in Area 8 with the Caspian Tern colony. The colony had 23 nests, most with only one egg. In June we observed 99 nests (17 with two eggs), but in July the colony was completely abandoned. This species was first noted breeding in the saltworks by Massey and Palacios (1994).

Least Tern (*Sterna antillarum*). We found five nests in June, on the same sand flat beside Area 1 used by the Snowy Plover. Nests contained one or two eggs. This species, listed as endangered (Gobiernos de los Estados Unidos Mexicanos 1994), had been previously reported breeding in Ojo de Liebre Lagoon by Bancroft (1927) and in the saltworks by Massey and Palacios (1994).

Black Skimmer (*Rynchops niger*). We found eight nests in June, with the Caspian and the Gull-billed Terns, on a sandy islet in Area S1-A. The nests had two or three eggs. In July the colony had grown to 22 nests with eggs, 85 adults, and 13 nestlings. This is the first breeding record for the Black Skimmer on the peninsula. The species has been recorded in Baja California Sur (Palacios and Alfaro 1992, Carmona et al. 1995), but the closest breeding colony is located on Montague Island, in the Colorado River delta (Palacios and Mellink 1994, Peresbarbosa 1995).

Savannah Sparrow (*Passerculus sandwichensis*). We found two nests (one with one egg, the other with one egg and two nestlings) in May, on a sandy islet in Area 8, and another (with two eggs) on an islet nearby. Nests were built in *Frankenia* bushes.

We counted totals of 24 and 15 adults on those islets. Ojo de Liebre Lagoon is the type locality of subspecies *P. s. anulus*.

Several characteristics of the saltworks enhance their use as breeding habitat for birds. According to the information provided to us by the Exportadora de Sal biology department (J. C. Peralta pers. comm.), physical and chemical conditions of the evaporation ponds are stable within each pond and through time, this being a basic requirement of the salt-production process. This stability promotes the growth of diverse fish and marine invertebrate communities, which provide an abundant and dense food resource for birds. Shallowness of the ponds makes prey easy to spot and catch. Also, the saltwork area is currently protected by Exportadora de Sal. This limits human transit and prevents any alteration of the birds' breeding habitat, as well as the extraction of prey species of economic value (i.e., fish, shrimp, and brine shrimp).

The large numbers of resident and migratory birds using the area (Carmona and Danemann, 1998), together with its use as a breeding area, suggests the Guerrero Negro saltworks are a functional, diverse, and high-quality bird habitat.

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LITERATURE CITED

Bancroft, G. 1927. Breeding birds of Scammon's Lagoon, Lower California. Condor 29:29–27.

Carmona, R., and Danemann, G. 1998. Avifauna del hábitat generado por el desarrollo salinero en las adyacencias de la Laguna Ojo de Liebre, B. C. S. Ciencias Marinas 24:389–408.

Carmona, R., Fernández, G., Brabata, G., and Arvizu, E. 1995. Variación temporal en la abundancia del rayador, *Rynchops niger* (Charadriiformes: Laridae) en Baja California Sur, México. Rev. Biol. Trop. 43 (1–3):313–315.

Castellanos, A., Salinas, F., and Ortega, A. 1994. Status and reproduction of the Peregrine Falcon at a coastal Lagoon in Baja California Sur, Mexico. J. Raptor. Res. 28:110–112.

Castellanos, A., and Ortega, A. 1995. Artificial nesting sites and ospreys at Ojo de Liebre and Guerrero Negro Lagoons, Baja California Sur, Mexico. J. Field Ornithol. 66: 117–127.

Gobierno de los Estados Unidos Mexicanos 1994. Norma oficial mexicana NOM-059-ECOL-1994, que determina las especies y subespecies de flora y fauna silvestres, terrestres y acuáticas en peligro de extinción, amenazadas, raras y las sujetas a protección especial, y que establece especificaciones para su protección. Diario Oficial de la Federación, 16 mayo 1994, pp. 1–60.

Howell, S. N. G., and Webb, S. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, England.

Kenyon, K. 1947a. Breeding populations of the Osprey in Lower California. Condor 49:152–158.

Kenyon, K. 1947b. Notes on the occurrence of birds in Lower California. Condor 49:210–211.

Kenyon, K. 1949. Observations on behavior and populations of Oyster-catchers in Lower California. Condor 51:193–199.

Massey, W. B., and Palacios, E. 1994. Avifauna of the wetlands of Baja California, Mexico: Current status. Studies Avian Biol. 15:45–57.

Palacios, E., and Alfaro, L. 1992. Occurrence of Black Skimmers in Baja California. W. Birds 23:173–176.

Palacios, E., and Mellink, E. 1992. Breeding bird records from Montague Island, northern Gulf of California. W. Birds 23:41–44.

Palacios, E., and Mellink, E. 1994. Additional breeding birds records from Montague Island, northern Gulf of California. W. Birds 24:259–262.

Peresbarbosa, R. E. 1995. Fluctuaciones espaciales y temporales de las aves que anidan en Isla Montague, Golfo de California, Mexico. M. S. thesis, CICESE, Ensenada, Baja California, México.

Wilbur, S. R. 1987. Birds of Baja California. Univ. of Calif. Press, Berkeley.

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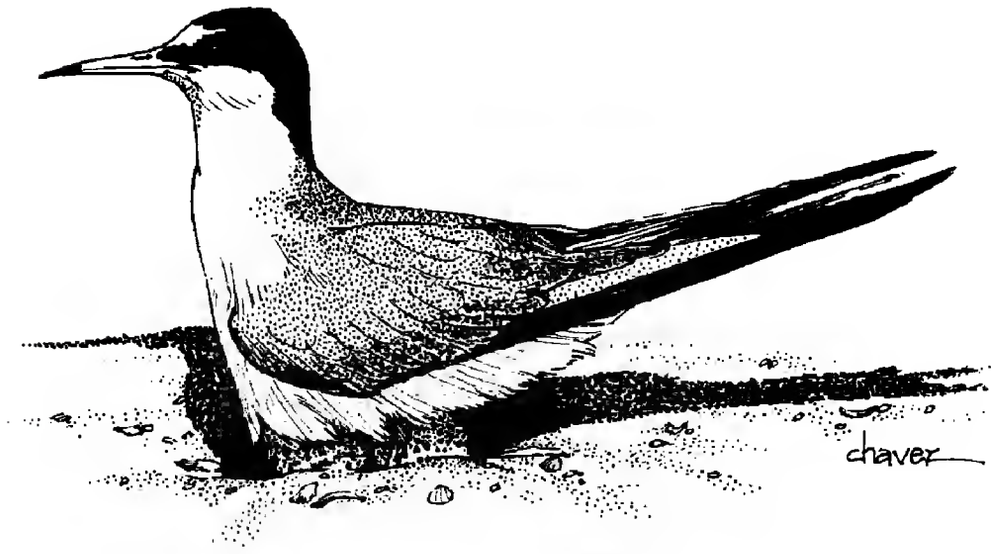

Least Tern *Sketch by Jamie M. Chavez*

THE STATUS OF HARLAN'S HAWK IN SOUTHERN CALIFORNIA

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Harlan's Hawk, *Buteo jamaicensis harlani*, has had a checkered taxonomic history since its description by Audubon (1830) from two specimens collected in Louisiana. It has at times been considered a separate species, a subspecies of the Red-tailed Hawk, *Buteo jamaicensis*, or perhaps even a local color morph or unique immature plumage of the latter rather than a distinct taxon. Ridgway (1890) suggested it be treated as a distinct subspecies of the Red-tailed Hawk, but it was still considered by some to be a separate species as late as 1959 (AOU 1957, Gabrielson and Lincoln 1959). Studies by Swarth (1926), Mindell (1983), and Snyder and Snyder (1991) have now established that *harlani* is best treated as the local subspecies of the Red-tailed Hawk in western, central, and south-coastal Alaska, southwestern Yukon, and northwestern British Columbia (AOU 1998). This view, however, is still not unanimous (Dunne et al. 1988). Harlan's Hawks make the longest migration of any of the several subspecies of the Red-tailed Hawk. Their path is east and southeast, passing over the ranges of a number of other subspecies (Mindell 1983, 1985), and they winter among individuals of the subspecies *calurus, borealis,* and *krideri*. The winter range of *harlani* is largely in the southern Great Plains from Kansas, southern Missouri, and Arkansas south to Texas and Louisiana (AOU 1957, Lowery 1974, Oberholser 1974); *harlani* may occur in northeastern Mexico in winter (Howell and Webb 1995). Individuals have been recorded as far east as Pennsylvania (Todd 1940) and Mississippi (AOU 1957) and west to California (Grinnell and Miller 1944, Small 1994, Garrett and Dunn 1981) and Washington (Lavers 1975). The type specimen of *Buteo cooperi*, collected near Mountain View, Santa Clara County, California, is also referable to *harlani* (Grinnell 1930).

In northern California, Harlan's Hawk is a rare but regular winter visitor, particularly in the Sacramento Valley and northeastern California (Grinnell and Miller 1944, Small 1994, T. Manolis pers. comm.). In southern California there are sight but no specimen records, from San Luis Obispo County south to Imperial County, mostly east of the coastal zone (Garrett and Dunn 1981, K. Garrett pers. comm.). In Orange County there are winter sight records of two individuals from the Plano Trabucco and Upper Newport Bay/San Joaquin Marsh (Hamilton and Willick 1996) and a recent sighting in Yorba Linda on 4 February 1998 (J. Kidd pers. comm.). Other recent sight records are of a dark individual with extensive white chest markings and very white tail seen 20 November 1994 in the Puente Hills near Whittier, Los Angeles County, and the same or very similar bird seen 18 February 1996 at Prado Dam on the Santa Ana River, Riverside County (J. Schmitt pers. comm.).

On 1 March 1990 an adult Harlan's Hawk was found shot at the Oak Canyon Nature Center in Anaheim Hills, Orange County. Attempts to rehabilitate it were unsuccessful. This specimen, the first for southern California, is number 7812 in the collection of California State University, Long Beach. An adult female, it had a regressed ovary and measured as follows: wing 393 mm, tail 212 mm, tarsus 95 mm. The tips of the outer primaries are badly broken, possibly due to its time in captivity. Although on the small size, the measurements for tail and tarsus are within the range given for female *harlani* by Oberholser (1974).

This bird is in the first adult dark-morph plumage (i. e., second basic) with retained juvenile outer ninth and tenth primaries and two to four secondaries. It exhibits the

following characteristics typical of *harlani*: (1) general color charcoal blackish brown with irregular white mottling on the chest and sparse whitish mottling on the belly, sides, and legs; (2) extensive white feather bases on occiput and nape; (3) bases of longest scapulars gray; (4) underwing coverts mostly black with sparse to moderate whitish spotting and mottling; (5) barring of remiges irregular and often disrupted and disintegrating to spots and freckling on primaries.

The tail is typical of *harlani* with very irregular freckling, spotting, and blotching and some longitudinal streaking as well as a tendency toward a subterminal band. No two rectrices are alike. There is a tendency for two or three thick dark brown bands in the basal portion of the outer vanes of some rectrices. There is a broad rufous tinge to areas of the tail and upper tail coverts. On the tail, this rufous is confined mostly to the outer vanes, the inner vanes appearing largely whitish in ground color and, on average, more sparingly marked that the outer vanes.

Confusion with similar appearing but clearly red-tailed dark-morph adult Red-tailed Hawks has perhaps hindered detection of additional Harlan's Hawks in southern California and other parts of the winter range. However, field identification of Harlan's Hawk has been greatly facilitated by several publications dealing with *Buteo* hawks (Lavers 1975, Mindell 1985, Kaufman 1989, Wheeler and Clark 1995). They emphasize the whitish tail with dark subterminal band and overall lack of brown or rufous tones in the body plumage. A slimmer appearance with longer tail and primaries and straight-edged wings are also mentioned as field marks (Dunne et al. 1988). White streaking or spotting on the chest is typical (Lavers 1975) and can be extensive in intergrades between *B. j. harlani* and *B. j. calurus* (Mindell 1983, 1985). Closer examination of all dark Red-tailed Hawks may augment our knowledge of the status and distribution of Harlan's Hawk in winter.

We thank Marge Gibson for her attempts to save this bird and Jason Bennett for his preparation of the specimen. We are indebted to John Schmitt for examining the specimen and providing an analysis of the plumage as well as contributing his field observations. Kimball Garrett provided additional helpful comments on the manuscript, and Tim Manolis provided comments and notes on Harlan's Hawk's status in northern California.

LITERATURE CITED

American Ornithologists' Union. 1957. Check-list of North American Birds, 5th ed. Am. Ornithol. Union, Baltimore, MD.

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Audubon, J. J. 1830. Birds of America, elephant folio, vol. 1. J. J. Audubon, London.

Dunne, P., Sibley, D. and Sutton, C. 1988. Hawks in Flight. Houghton Mifflin, Boston.

Gabrielson, I. N., and Lincoln, F. C. 1959. The Birds of Alaska. Stackpole, Harrisburg, PA.

Garrett, K., and Dunn, J. 1981. Birds of Southern California: Status and Distribution. Los Angeles Audubon Soc., Los Angeles.

Grinnell, J. 1930. The status of the Cooper Henhawk. Condor 32:259–260.

Grinnell, J., and Miller, A. H. 1944. The distribution of the birds of California. Pac. Coast Avifauna 27.

Hamilton, R. A., and Willick, D. R. 1996. The Birds of Orange County, California: Status and Distribution. Sea and Sage Press, Irvine, CA.

Howell, S. N. G., and Webb, S. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, England.

Kaufmann, K. 1989. Buteos of the winter fields. Am. Birds 43:1241–1244.

Lavers, N. 1975. Status of the Harlan's Hawk in Washington, and notes on its identification in the field. W. Birds 6:55–62.

Lowery, G. M., Jr. 1974. Louisiana Birds, 3rd ed. La. State Univ. Press, Baton Rouge.

Mindell, D. P. 1983. Harlan's Hawk (*Buteo jamaicensis harlani*), a valid subspecies. Auk 100:161–169.

Mindell, D. P. 1985. Plumage variation and winter range of Harlan's Hawk (*Buteo jamaicensis harlani*). Am. Birds 39:127–133.

Oberholser, H. C. 1974. The Bird Life of Texas. Univ. Texas Press, Austin.

Ridgway, R. 1890. Harlan's Hawk a race of the Red-tail, and not a distinct species. Auk 7:205.

Snyder, N. S., and Snyder, H. A. 1991. Birds of Prey: Natural History and Conservation of North American Raptors. Voyageur Press, Stillwater, MN.

Swarth, H. S. 1926. Report on a collection of birds and mammals from the Atlin Region, northern British Columbia. Univ. Calif. Publ. Zool. 30:51–162.

Small, A. 1994. California Birds: Their Status and Distribution. Ibis Publ. Co., Vista, CA.

Todd, W. E. C. 1940. Birds of Western Pennsylvania. Univ. Pittsburgh Press, Pittsburgh.

Wheeler, B. K., and Clark, W. S. 1995. A Photographic Guide to the North American Raptors. Academic Press, New York.

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WHERE DO PIGEON GUILLEMOTS FROM CALIFORNIA GO FOR THE WINTER?

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The Pigeon Guillemot (*Cepphus columba*) nests at numerous small colonies and scattered individual sites from the Channel Islands, California, north to Alaska (Ewins et al. 1993). During the nonbreeding season birds are virtually absent from California, Oregon, and the outer coast of Washington (e.g., Briggs et al. 1987), and the winter distribution of Pigeon Guillemots breeding along the west coast of North America is at best incompletely known. The species' postbreeding movements have been thought to be to the north from California and Oregon, though systematically collected data are minimal. There is evidence that at least some move north to relatively protected waters of the Strait of Juan de Fuca, Puget Sound, and adjacent areas ("inland marine waters") of Washington and British Columbia (e.g., Ainley et al. 1990, Ewins 1993, Ewins et al. 1993), where some census records indicate that numbers increase during the winter (e.g., Campbell et al. 1990). Here we contribute to the understanding of the wintering areas of Pigeon Guillemots along the Pacific coast by summarizing records from one-day boat trips off southwestern Washington over 28 years.

Between September 1971 and October 1999 we systematically censused seabirds during 316 one-day bird-watching cruises aboard chartered sportfishing vessels off Grays Harbor, Washington (see Wahl and Tweit 2000). Effort was greatest in January and from April through mid-October (Table 1). Numbers of birds were counted or estimated for census periods of about 30 minutes (within "depth habitats"; Table 2). A total of 6306 individual census periods covered 43,758 km. Guillemots were recorded only from March into October, and our analysis is for those months only (Tables 2 and 3). In addition to these cruises, Wahl spent four weeks total in September, January, and April on a University of Washington research vessel off Copalis Beach, Washington, about 20 km north of Grays Harbor, censusing birds and mammals to 126° 30' W (data not used in Tables 1–3).

Though census effort was much greater offshore, almost 90% of guillemots recorded were in the Grays Harbor entrance channel and immediately offshore within

Table 1 Pigeon Guillemot Censuses from Grays Harbor out to 2000-m Depth, September 1971–October 1999

Month	Total birds	Census effort (km)	Birds/km
Jan	0	1,232	0
Feb	0	262	0
Mar	62	461	0.13
Apr	173	2,481	0.07
May	809	4,783	0.17
Jun	252	869	0.29
Jul	749	5,798	0.13
Aug	1507	11,262	0.13
Sep	136	11,592	0.01
Oct	40	4697	0.01
Nov	0	197	0
Dec	0	124	0

Table 2 Pigeon Guillemot Numbers by Depth, March–October

Depth	Total birds	Census effort (km)	Birds/km
Grays Harbor channel	2909	2938	0.99
<20 m	400	3,016	0.13
20–50 m	227	4,253	0.05
50–100 m	67	9,261	0.01
100–200 m	75	13,684	0.01
200–1000 m	45	7,360	0.01
1000–2000 m	5	867	0.01
>2000 m	0	565	0.00
Total	3728	41,944	0.09

the 20-m-depth contour, and another 6% were just outside of that (Table 2). Highest numbers—from May to July (Table 3)—reflected at least in part the nesting activity of some 10–20 pairs (Speich and Wahl 1989, unpubl. obs.). In August, and to a lesser extent in September, we noted adults in postbreeding plumage, usually in small groups, flying north, with a few birds recorded to the edge of the continental shelf over depths of 1000 to 2000 m (Table 3), as far west as 125° 07′ W. These birds were flying a route that would be essentially a straight line from northern California and Oregon to the entrance to the Strait of Juan de Fuca. In September, birds per kilometer dropped by over 90% from May–August numbers, with only a few noted far offshore. On surveys additional to the trips summarized here, two guillemots were seen 30–40 km offshore, one each in September 1968 and 1976 (Wahl unpubl.). By October no birds were seen offshore. None at all were seen on November–February trips (Table 1), on research cruises west to 126° 30′ W, or on two late January–early February trips south along 125° W off Washington and Oregon (Wahl unpubl.), strongly suggesting that Pigeon Guillemots do not winter offshore. Our spring (March–May) survey sample size is small, but the eight birds seen offshore then may indicate a southbound offshore movement.

Table 3 Pigeon Guillemots per Kilometer off Grays Harbor by Ocean Depth and Month, 1971–1999

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Grays Harbor channel	1.41	1.31	1.53	2.23	1.51	0.12	0.11	
<20 m	—	0.15	0.39	0.01	0.16	0.17	0.02	0.02
20–50 m	0.02	—	0.14	0.94	+[a]	0.02	0.01	0.00
50–100 m	—	+	+	—	+	0.02	0.01	—
100–200 m	0.01	+	+	—	—	0.02	+	—
200–1000 m	—	—	—	0.01	—	0.02	+	—
1000–2000 m	nc[b]	—	—	nc	—	0.02	—	—
>2000 m	nc	—	—	nc	nc	nc	—	—
All depths	0.13	0.07	0.17	0.29	0.13	0.13	0.01	0.01

[a]Present, <0.01.

[b]nc, no census.

Briggs et al. (1987) stated that guillemots "almost leave" California from August through February. Ainley et al. (1990) reported a northward seasonal shift of recoveries of fledglings banded on the Farallon Islands to at least as far as British Columbia and that after October one-third of recoveries were from Washington north. Christmas bird count (CBC) data indicate small numbers of birds along the Oregon coast in winter. In British Columbia, Vermeer and Morgan (1997) stated that few guillemots remain in the Queen Charlotte Islands after early September. Campbell et al. (1990) described movement of birds from the British Columbia coast into Queen Charlotte Sound and protected waters of the straits of Georgia and Juan de Fuca; thus it is likely that birds breeding north of Washington also winter in inland marine waters.

Systematic, year-round census data covering all of Washington's inland marine waters are lacking, though there have been a number of surveys covering parts of the region. Comparisons between seasons are complicated by varying census methods, seasonal variations in observation conditions, and differences in the detectability and identification of Pigeon Guillemots. Dispersing and foraging birds from a few large colonies further complicate analysis of existing data. Numbers from CBCs in Washington suggest that guillemots shift into inland marine waters in winter. At Grays Harbor guillemots were found on 11 of 24 CBCs from 1972 to 1997, with a maximum of five birds. In contrast, counts in inland marine waters were relatively high, (e.g., a maximum of 1221 on 22 December 1989 at Sequim–Dungeness). Other surveys in the San Juan Islands, Georgia Strait, and Puget Sound south to Olympia produced winter numbers far above summer breeding numbers. One consistent effort in 1978–79 (Wahl et al. 1981), in which birds were censused monthly from a ferry through the San Juan Islands, showed that November–March numbers of Pigeon Guillemots were about five times those in June and July (Wahl unpubl.). Comparison of 14 CBCs in inland marine waters with data from other censuses covering the same areas (Wahl et al. 1981; unpubl.) suggest winter numbers may be twice as large as summer populations and are too large to consist of summer residents only.

Data from our surveys off Grays Harbor support the concept of a postbreeding migration of Pigeon Guillemots north from California, Oregon, and the outer coast of Washington to inland marine waters. Such a seasonal northward migration for the winter corresponds with that of many Brandt's Cormorants (*Phalacrocorax penicillatus*; Boekelheide et al. 1990) and Common Murres (*Uria aalge*; Briggs et al. 1992) and with patterns of postbreeding dispersal of Brown Pelicans (*Pelecanus occidentalis*) and Heermann's Gulls (*Larus heermanni*; Boekelheide et al. 1990).

Guillemots' occurring generally near shore makes them vulnerable to oil spills (Ewins et al. 1993). From our data, it appears that a large proportion of the southern population of Pigeon Guillemots concentrates in a relatively limited area of Washington and British Columbia in winter. This area also supports heavy ship traffic, four oil refineries, and many other industries. A major winter oil spill here could pose a significant risk to the entire southern population. For this risk to be assessed, detailed information on the size, distribution, and geographic origins of the wintering population in the waters of Washington and British Columbia is needed.

Thanks are due D. R. Paulson, B. LaBar, P. Anderson, a number of other assisting observers, and, especially, participants who financed trips. D. G. Ainley and J. Hodder made very helpful comments for corrections of a sloppy manuscript.

LITERATURE CITED

Ainley, D. G., Boekelheide, R. J., Morrell, S. H., and Strong, C. S. 1990. Pigeon Guillemot, in Seabirds of the Farallon Islands (D. G. Ainley and R. J. Boekelheide, eds.), pp. 276–305. Stanford Univ. Press. Stanford, CA.

Boekelheide, R. J., Ainley, D. G., Morrell, S. H., and Lewis, T. J. 1990. Brandt's Cormorant, in Seabirds of the Farallon Islands (D. G. Ainley and R. J. Boekelheide, eds.), pp. 163–194. Stanford Univ. Press. Stanford, CA.

Briggs, K. T., Tyler, W. B., Lewis, D. B., and Carlson, D. R. 1987. Bird communities at sea off California: 1975–1983. Studies Avian Biol. 11.

Briggs, K. T., Varoujean, D. H., Williams, W. W., Ford, R. G., Bonnell, M. L., and Casey, J. L. 1992. Seabirds of the Oregon and Washington OCS, 1989–1990, in Oregon and Washington marine mammal and seabird surveys. Final report (J. J. Brueggeman, ed.), pp. 3-1–3-156. OCS Study MMS 91-0093. U.S. Dept. Interior, Minerals Mgmt. Service, Pacific OCS Office, 1340 W. Sixth St., Los Angeles, CA 90017.

Campbell, R. W., Dawe, N. K., McTaggert-Cowan, I., Cooper, J. M., Kaiser, G. W., and McNall, M. C. E. 1990. The Birds of British Columbia, vol. 2. Royal Br. Columbia Mus., Victoria.

Ewins, P. J. 1993. Pigeon Guillemot (*Cepphus columba*), in the Birds of North America (A. Poole and F. Gill, eds.), no. 49. Acad. Nat. Sci., Philadelphia.

Ewins, P. J., Carter, H. R., and Shibaev, Y. V. 1993. The status, distribution, and ecology of inshore fish-feeding alcids (*Cepphus* guillemots and *Brachyramphus* murrelets) in the North Pacific, in The status, ecology and conservation of marine birds of the North Pacific (K. Vermeer, K. T. Briggs, K. H. Morgan, and D. Siegel-Causey, eds.), pp. 164–175. Can. Wildlife Serv. Spec. Publ., Ottawa.

Morgan, K. H. 1997. The distribution and seasonality of marine birds of the Queen Charlotte Islands, in The ecology, status and conservation of marine and shoreline birds of the Queen Charlotte Islands (K. Vermeer and K. H. Morgan, eds.), pp. 78–91. Can. Wildlife Serv. Occas. Paper 93.

Speich, S. M., and Wahl, T. R. 1989. Catalog of Washington seabird colonies. U.S. Fish & Wildlife Serv. Biol. Rep. 88 (6). MMS 89-0054.

Wahl, T. R., Speich, S. M., Manuwal, D. A., Hirsch, K. V., and Miller, C. 1981. Marine bird populations of the Strait of Juan de Fuca, Strait of Georgia and adjacent waters in 1978 and 1979. U.S. Environmental Protection Agency, DOC/EPA Interagency Energy/Environment Res. & Dev. Program Rep. EPA/600/f-81/156. Natl. Oceanic & Atmospheric Admin., 7600 Sand Point Way NE, Seattle, WA 98115.

Wahl, T. R., and Speich, S. M. 1984. Survey of marine birds in Puget Sound, Hood Canal and waters east of Whidbey Island, Washington, in summer 1982. W. Birds 15:1–14.

Wahl, T. R. and B. Tweit. 2000. Seabird abundances off Washington, 1972-1998. W. Birds 31:69–88.

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BOOK REVIEWS

Gathering of Angels: Migrating Birds and Their Ecology. Kenneth P. Able (editor). 1999. Cornell Univ. Press, Ithaca, NY. 193 pages, including 24 pages of full-color plates, 10 black and white photos, 12 maps, 16 figures and tables. Hardback, $29.95. ISBN 0-8014-3362-2.

While slender in volume, *Gathering of Angels* is robust in information on the migration of birds. Editor Kenneth Able, himself a renowned authority on bird migration, convinced eight of his North American colleagues to contribute chapters on the migrations of birds that pass through North America.

The book begins with two general and brief chapters by Able on the scope and evolution of bird migration and the behavior, energetics, and navigation of birds. These serve to introduce the reader to the many-faceted issues of bird migration. Fittingly, the first chapter by an invited author is by Sidney Gauthreaux, a pioneer in the study of bird migration through the use of radar. He presents an insightful look into the controversy over whether birds migrated across the Gulf of Mexico or around it, and how radar studies helped solve some of these mysteries. This chapter is followed by another centered on Gulf of Mexico migrants, by Frank Moore, dealing especially with the stopover ecology of these birds. He shows how critical it is for migrants to have protected stopover sites where they can rest and build up fat reserves in the absence of disturbance before continuing migration.

The next six chapters of the book focus on the migration of either one or just a few species of birds ranging from cranes to hummingbirds. These chapters emphasize the fact that while we have pieced together much about the migration of certain bird species, we actually know little about the migration of individual birds, because of the difficulties in tracking them over large distances. James Baird's chapter on Blackpoll Warblers is a good example. He presents a great deal of evidence that suggests these 12-gram birds can and do fly nonstop from eastern Canada and northeastern United States to northern South America via a transoceanic route, yet it has still not been proved conclusively. Perhaps it never will, although today's small radiotransmitters make this a possibility. Contrast the Blackpoll's migration route with that of the Broad-winged Hawk as written about by Keith Bildstein. Bildstein describes the Broad-winged Hawk's aversion to water as due to its reliance on thermals for migration. While southbound Blackpoll Warblers and Broad-winged Hawks may start from the same place in the northeast, Broad-winged Hawks migrate through the United States, around the Gulf of Mexico, and through Mexico and Central America on their way to South America.

Following Bildstein's chapter is one by Gary Krapu on Sandhill Cranes. This chapter focuses attention on the Platte River habitat used by staging cranes during spring migration rather than on their actual migration, and as such it stands apart slightly from the other chapters. Krapu tantalizes the reader with a mention of Sandhill Cranes' being fitted with satellite platforms so their migration can be followed but offers no results from the first season of tracking.

The next two chapters, by scientists who have helped lead the way in the study of shorebird migration in North (and South) America, deal with shorebirds. Brian Harrington writes on the truly spectacular migrations of the White-rumped and Baird's sandpipers. These high Arctic breeders appear to make a non-stop transoceanic flight of up to 4000 km from eastern Canada and northeastern United States to northeastern South America (like the Blackpoll Warbler), then continue to southern South America for their nonbreeding season. Their return flight takes them on a different route across the Caribbean and Gulf of Mexico, through the ephemeral wetlands of the Great Plains, and then back to the high Arctic. While White-rumped and Baird's sandpipers do not generally rely heavily on any single stopover (with the possible exception of Cheyenne Bottoms in Kansas, a site that dries up in some years),

Dunlins and Western Sandpipers do, as described by Stan Senner. The immense, remote Copper River Delta just southeast of the Prince William Sound in Alaska, is arguably one of the most important stopover sites for migratory waterbirds in the world, and the author does a captivating job in describing its importance to the successful migrations of Dunlins and Western Sandpipers. Almost the entire world's population of Western Sandpipers appears to stop at the Copper River Delta during spring, and most of the west coast population of the Dunlin (*Calidris alpina pacifica*) does the same.

The last chapter focusing on specific species deals with our smallest birds, the hummingbirds. William Calder has long studied the migration of hummingbirds, especially the Rufous and Broad-tailed, through the Rocky Mountains. He presents an amazing picture of how these tiny creatures gather enough fuel in the form of body fat, in a very unpredictable environment, to complete migrations of thousands of kilometers successfully.

Able ends the book with a succinct plea for why we should be concerned about conserving migratory birds and what problems these creatures face. In a pessimistic but politically brave note, he points out that unless industrialized and nonindustrialized countries do something about curbing their insatiable expansions, especially through population growth and use of resources, life's diversity, including migratory birds, faces a diminished future.

Gathering of Angels is generally well edited. There are few and minor typos such as "Great plains" on p. 105 and labeling the figure on p. 18 as map 2.1. The maps and figures are clear and informative, with the exception of map 7.1 (p. 107), which in my copy is blurry and hard to read. Photographs are well selected.

Who should buy *Gathering of Angels*? Even before I was asked to review this book, I had purchased it as a perfect book to read while traveling. For those looking for the latest review on bird migration, tied in to the latest theories, with a complete list of references, this book is not for you (nor was it intended to fill such a role). Instead, it offers a fascinating, very readable, and personal look at bird migration in North America from the long-term perspectives of the distinguished contributing authors. *Gathering of Angels* should be an automatic buy for all private, public, and academic libraries with bird sections, especially given its relatively modest cost.

Nils Warnock

Swifts: A Guide to the Swifts and Treeswifts of the World, second edition, by Phil Chantler, illustrated by Gerald Driessens. 2000. Yale Univ. Press, New Haven, CT. 240 pp., 24 color plates. Hardback $40.00. ISBN 0-300-07936-2.

The first edition of *Swifts* was published in 1995 and received mixed reviews (e.g., see *Cotinga* 6:42-43, 1996). Hence, perhaps, the fairly quick appearance of a second edition. The jacket cover notes that particular attention has been paid to neotropical swifts and that several plates have been revised. I reviewed *Swifts* in terms of New World species and changes over the first edition to answer two questions: if you own the first edition is it worth buying the second? If you own neither, should you make the financial leap?

Numerous specific criticisms of the first edition have been addressed, and in particular I commend the author (and publisher) for more frequent inclusion of direct literature citations. Although citations seem to have been included at random, and remain rather thin on the ground, the author has summarized a wealth of literature concerning swifts. Inevitably some references were overlooked. Not surprisingly perhaps, given the publication date, records from Sonora of the White-naped Swift and Chestnut-collared Swift (Russell and Monson 1998, *The Birds of Sonora*, Univ. Arizona Press) were missed, but White-collared Swifts have been known from central-

west Mexico for some time (e.g., Howell 1994, *Euphonia* 3:45-46) and are not mentioned.

The plates are printed much more clearly and on glossier paper than in the first edition but besides this, and some different background colors, I detected no substantive changes in illustrations of any New World species. Unstandardized postures still do not facilitate comparison among similar species and shapes of most species suggest the artist did not visit the New World, e.g., the disconcertingly fat-bodied and stubby-winged *Aeronautes* which, in life, are so streamlined.

Revisions to the text have met with mixed success. Some accounts have been greatly expanded, e.g., for the enigmatic White-fronted Swift, although a statement in the introduction (p. 21) that "a recent sight record appears to support its [= White-fronted Swift's] validity as a species" is unfathomable. Conservation, status, and habitat data from Stotz et al. (*Neotropical Birds: Ecology and Conservation*, Univ. Chicago Press, 1996) are valuable additions to each account. Some maps have been changed, e.g., for the Black Swift, but this species' range in Mexico (wrongly claimed to be part of Central America) was more accurately portrayed in the first edition (and remains accurate in the text). The introductory taxonomy section notes specifically that Marin's recent revision of some *Chaetura* swifts (*Ornithol. Monogr.* 48:431–443, 1997) has not been followed, but I found no mention of the possible merger of the Chestnut-collared Swift into *Streptoprocne* (suggested in 1992) and followed by the AOU (1998, *Checklist of North American Birds*, 7th ed.).

Many needed changes did not happen, probably because, like so many books in this genre, *Swifts* suffers from its author's lack of adequate New World field experience and peer review. For example, the sections on movements of the Black Swift and White-throated Swift comprise partially organized facts rather than syntheses of information. Coastal nesting of Black Swifts in central California is not mentioned, and an unreferenced statement under the White-throated as "in Mexico believed to be rare" is truly bizarre (noted as "fairly common to common" by Howell and Webb 1995, *A Guide to the Birds of Mexico and Northern Central America*, Oxford Univ. Press). Other accounts remain inexplicably inaccurate (e.g., for range and elevation limits), and voice in general is treated poorly for all New World species.

In conclusion, the second edition of *Swifts* is disappointing and overpriced, and I see no reason to own it (or the first). The treatments for Old World species may be better, but I regret to say there is still great need for a good book on New World swifts.

Steve N. G. Howell

FEATURED PHOTO

TWO LITTLE-KNOWN JUVENILE SHOREBIRDS

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Our knowledge of shorebird identification, age determination, and status along the Pacific coast and elsewhere in North America was only in the fledgling stage in 1977 when Prater, Marchant, and Vuorinen published their groundbreaking *Guide to the Identification and Ageing of Holarctic Waders*. Additional major reference works (e.g., Hayman, Marchant, and Prater 1986, Chandler 1989, Paulson 1993, and Rosair and Cottridge 1995) and a myriad of shorter articles about shorebird status and identification have been published over the ensuing 23 years. Nevertheless, several species remain difficult field-identification challenges. I discuss here two plumages with which few birders in western North America have field experience.

The lower photo on this issue's back cover depicts a mid-sized shorebird with grayish upperparts, grayish and whitish underparts, and a medium-long straight bill. Most birders will recognize it as a tattler. The familiar Wandering Tattler (*Heteroscelus incanus*) breeds in Alaska, extreme eastern Siberia, Yukon, and northern British Columbia; it winters along rocky shores from central California (very rarely farther north) south to South America and on islands throughout much of the Pacific Ocean west to eastern Australia. It is a very rare to casual migrant through the interior West, accidental farther east. The Gray-tailed Tattler (*H. brevipes*) breeds in northern Siberia and winters throughout much of the western Pacific, with the Wandering on many islands, as well as along the mainland coast from eastern Asia to Australia. In North America it is a rare but regular migrant in both spring and fall through western Alaska, where southbound birds include both adults and juveniles. Records to date suggest the species may be more numerous in late summer and early fall (late July to mid-September, with a few to early October) than in spring (mid-May to mid-June). There are also several records for farther east in Alaska (e.g., at Barrow, Seward, and Middleton Island). In the lower 48 states a juvenile was at Ocean Shores, Washington, on 13 October 1975, and an adult was at the Lancaster sewage ponds in the southern California interior on 23 July 1981 (Paulson 1986, 1993). Three sight reports of Gray-tailed Tattlers from coastal northern California during May 1998 coincided with an unprecedented "invasion" of Bristle-thighed Curlews (*Numenius tahitiensis*) (Roberson et al. 1998), although to date none of the 1998 reports has been accepted by the California Bird Records Committee.

Differentiating the two tattler species can be difficult. As in most shorebird identification challenges, ascertaining the bird's age is one of the first requirements. This bird is a juvenile, on the basis of the distinct pale edges, notches, and spots visible on the mantle, scapulars, wing coverts, and tertials. In fact, the extent of these notches and spots is an important distinction between the two species. In the juvenile Wandering, these pale markings vary from narrow pale fringing to more extensive fringing, sometimes with limited pale spotting along the edges of some of these same feathers. In the juvenile Gray-tailed, these pale notches and spots are more extensive still, especially on the coverts and tertials, as this bird shows. Another character useful in separating the two species is the color of the flanks. In the Wandering the sides and flanks are strongly washed with gray, whereas in the Gray-tailed they are more whitish (Paulson 1986) and thus contrast more with the gray wing. Among approximately eight calling (see below) juvenile Gray-taileds at Gambell, Saint Lawrence Island, Alaska, during early September 1998 and 1999, I found that most had at least a faint gray wash to the sides and upper flanks, as this individual shows, and were not as clean white as Paulson (1986, 1993) implies.

Other distinctions between the two species in juvenal plumage include the tendency for the Gray-tailed to be slightly paler gray above, often with a slight brownish tinge (which this bird showed under brighter lighting), and to show a broader, more extensive whitish supercilium, which often extends farther forward to meet across the forehead, as well as farther back behind the eye (Paulson 1986, 1993, Hirst and Proctor 1995, Rosair and King 2000). This last character varies from individual to individual, however. Additional characters that may be variable or difficult to use in the field include the Gray-tailed's contrastingly paler uppertail coverts and tail feathers, slightly paler gray breast, slightly shorter primary projection, shorter nasal groove (a valuable in-hand character) (Paulson 1986, 1993, Hirst and Proctor 1995, Rosair and King 2000), and use of a wider range of habitats, including mudflats and sandy beaches. But Wandering Tattlers, especially migrants, occasionally use these same habitats.

Differences in flight calls are the safest means of separating the two species. The Wandering Tattler gives a series of strident whistled notes of variable number (from two to almost ten) but all on the same pitch. The Gray-tailed gives a two-noted whistled upslurred ploverlike *tu-wheet*. Rarely it adds a weak introductory note, yielding three syllables. The bird in this photograph repeatedly gave calls typical of the Gray-tailed. I photographed it at Gambell, Alaska, on 6 September 1999.

The upper photo also shows a juvenile, as evidenced by the extensive pale and rusty fringes to the mantle feathers, scapulars, coverts, and tertials. Though no easy size comparisons are possible, it still appears to be a fairly small shorebird. The darkness in front of the eye and on the forehead is the result of matted feathers. One identification that might be suggested is a juvenile Pectoral Sandpiper (*Calidris melanotos*). But this bird has an obvious blackish patch on the lower breast and upper belly, a pattern unlike the Pectoral's on the wing coverts and tertials, an entirely dark bill that appears too long and slightly droopy, and black legs. The blackish patch and black legs also help to eliminate the rarely seen juvenal plumage of the Rock Sandpiper (*C. ptilocnemis*). This bird is, in fact, a juvenile Dunlin (*C. alpina*). Given that the two subspecies of the Dunlin widespread in North American (*C. a. hudsonia* and *C. a. pacifica*) molt from juvenal plumage into largely basic plumage *before* they leave the arctic, few North American observers have seen this plumage in the field. Subspecies *pacifica* breeds in western Alaska and winters along the Pacific coast; subspecies *hudsonia* breeds farther east, in Canada, and winters in eastern North America. The third subspecies breeding in North America, *C. a. arcticola*, nests in northern Alaska and winters in Asia. Unlike those of the other two forms, adults of this race may migrate south in alternate plumage. Identifying this slightly smaller subspecies along the North American Pacific Coast is likely possible only through in-hand bill measurements of birds of known sex (Paulson 1993). I am unsure whether or not juveniles of this race migrate before molting. The Dunlins of Scandinavia and Greenland, *alpina* and *arctica*, migrate earlier in the fall than the North American subspecies and, like most other species of shorebirds, molt after they migrate (Paulson 1993). The Dunlins arriving earliest along the Pacific coast south of Alaska typically appear in mid-September. First-year birds seen during September and October have already molted largely into first basic plumage, with only a few juvenal buff- or rusty-fringed scapulars and possibly a little of the dark belly patch remaining. I photographed the bird featured on the back cover at Gambell, Alaska, in late August 1999.

LITERATURE CITED

Chandler, R. J. 1989. The Facts on File Field Guide to North Atlantic Shorebirds. Facts on File, New York.

Hayman, P., Marchant, J., and Prater, T. 1986. Shorebirds: An Identification Guide to the Waders of the World. Houghton Mifflin, Boston.

Hirst, P., and Proctor, B. 1995. Identification of Wandering and Grey-tailed Tattlers. Birding World 8:91–97.

Prater, A. J., Marchant, J. H., and Vuorinen, J. 1977. Guide to the Identification and Ageing of Holarctic Waders. Br. Trust Ornithol., Tring, England.

Paulson, D. 1986. Identification of juvenile tattlers, and a Gray-tailed Tattler record from Washington. W. Birds 17:33–36.

Paulson, D. 1993. Shorebirds of the Pacific Northwest. Univ. of Wash. Press, Seattle.

Roberson, D., Bailey, S. F., and Singer, D. S. 1998. Middle Pacific Coast region: Spring migration: March 1 to May 31, 1998. Field Notes 52:384–388.

Rosair, D., and Cottridge, D. 1995. Photographic Guide to the Shorebirds of the World. Facts on File, New York.

Rosair, D., and King, J.R. 2000. Wandering and Grey-tailed Tattlers. Birding World 13:121–123.

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Cover photo by © Tim Reeves of Farmington, New Mexico: Harris's Sparrow, immature (*Zonotrichia querula*), Blanco, New Mexico, March, 1998.

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Send manuscripts to Kathy Molina, Section of Ornithology, Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles, CA 90007. For matter of style consult the Suggestions to *Contributors to Western Birds* (8 pages available at no cost from the editor) and the *Council of Biology Editors Style Manual* (available for $24 from the Council of Biology Editors, Inc., 9650 Rockville Pike, Bethesda, MD 20814).

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WESTERN BIRDS

Volume 31, Number 4, 2000

BREEDING LANDBIRDS OF A HIGHLY THREATENED OPEN SPACE: THE PUENTE–CHINO HILLS, CALIFORNIA

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ABSTRACT: Surveys of breeding birds in the remaining 20,000 ha of open space in the Puente–Chino Hills of southern California during spring and early summer 1997 and 1998 revealed several species declining or nearing extirpation in the Los Angeles area. This report represents the first treatment of the distribution of the birds of this fast-disappearing natural area. From data collected on point counts and transects, three areas appear in need of immediate conservation action for bird diversity in the Puente–Chino Hills to be maintained: the coastal sage scrub of northern Brea/Yorba Linda, the grassland of southern Rowland Heights, and the grassland of upper Tonner Canyon.

Tenuously separating the metropolitan areas of Los Angeles (LAX), Orange (ORA), Riverside (RIV) and San Bernardino (SBD) counties, the Puente–Chino Hills are the site of numerous ongoing battles over development and open-space conservation. In order to guide future land acquisitions and conservation projects here, California's Mountain Recreation and Conservation Authority contracted with the University of California, Riverside, to survey birds of the Puente–Chino Hills during 1997 and 1998. During this survey I encountered several species whose ranges are poorly known in the Los Angeles area or that are nearly extirpated there, such as the California Gnatcatcher (*Polioptila californica*), Bell's Vireo (*Vireo bellii*), Grasshopper Sparrow (*Ammodramus savannarum*), and several raptors. This report represents the first treatment of birds of the entire Puente–Chino Hills.

STUDY AREA

Physical Location

The eastern Los Angeles Basin features three ranges of low hills (100–500 m) that cover about 20,000 ha and loosely connect the San Gabriel and

Santa Ana mountains: the San Jose, Puente, and Chino hills. The Puente–Chino Hills extend northwest from the Santa Ana Mountains in eastern Orange and western Riverside counties and terminate about 50 km to the west at Whittier Narrows, forming a "peninsula" of open space through the urbanized eastern Los Angeles Basin (see Beier 1995). Their westernmost extension, north and west of Colima Rd., is widely referred to as the Whittier Hills. Currently, less than 30% of open space in the Puente–Chino Hills is protected as public land, mostly within Chino Hills State Park (about 5000 ha) in the extreme southeast (Figure 1).

The study area consisted of all open space west of State Route 71 and south of State Route 60 (Figure 2). It also included patches of undeveloped land within the community of Phillips Ranch, Pomona, located just north of State Route 60. The southern boundary of the study area was formed by (west to east) Whittier Blvd., Imperial Hwy., Yorba Linda Blvd./Weir Canyon Rd., and State Route 91. Patches of habitat interspersed in low-density residential development adjacent to the main body of open space (e.g., on steep hillsides within housing tracts) were also surveyed. Cities and communities within the study area include Whittier, Hacienda Heights, La Habra Heights, Rowland Heights, Diamond Bar, and Phillips Ranch (LAX), Brea and Yorba Linda (ORA), and Chino Hills and Sleepy Hollow (SBD).

Single-family tract housing accounts for most of the development within the hills, with small areas of older neighborhoods in La Habra Heights and Diamond Bar. Long bordered by urbanization to the north and south, the hills are now seeing their eastern border, the agricultural Chino region,

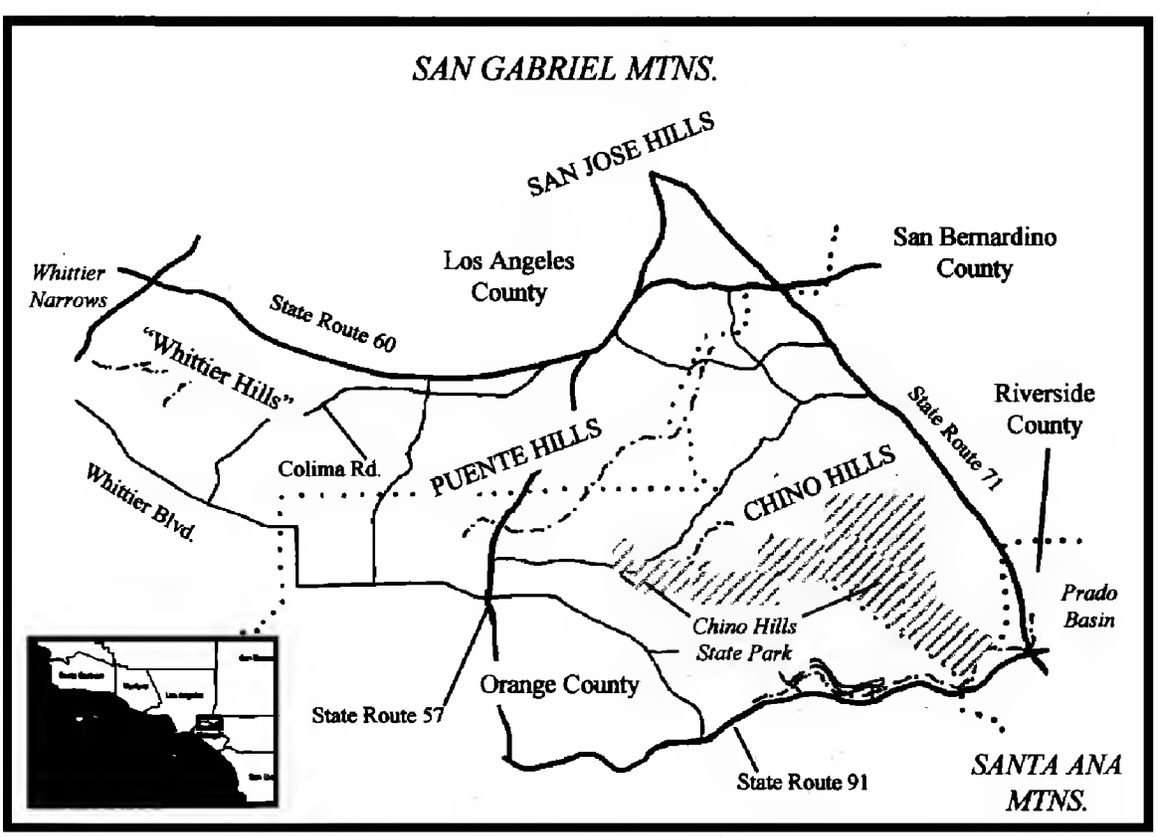

Figure 1. Puente–Chino Hills region.

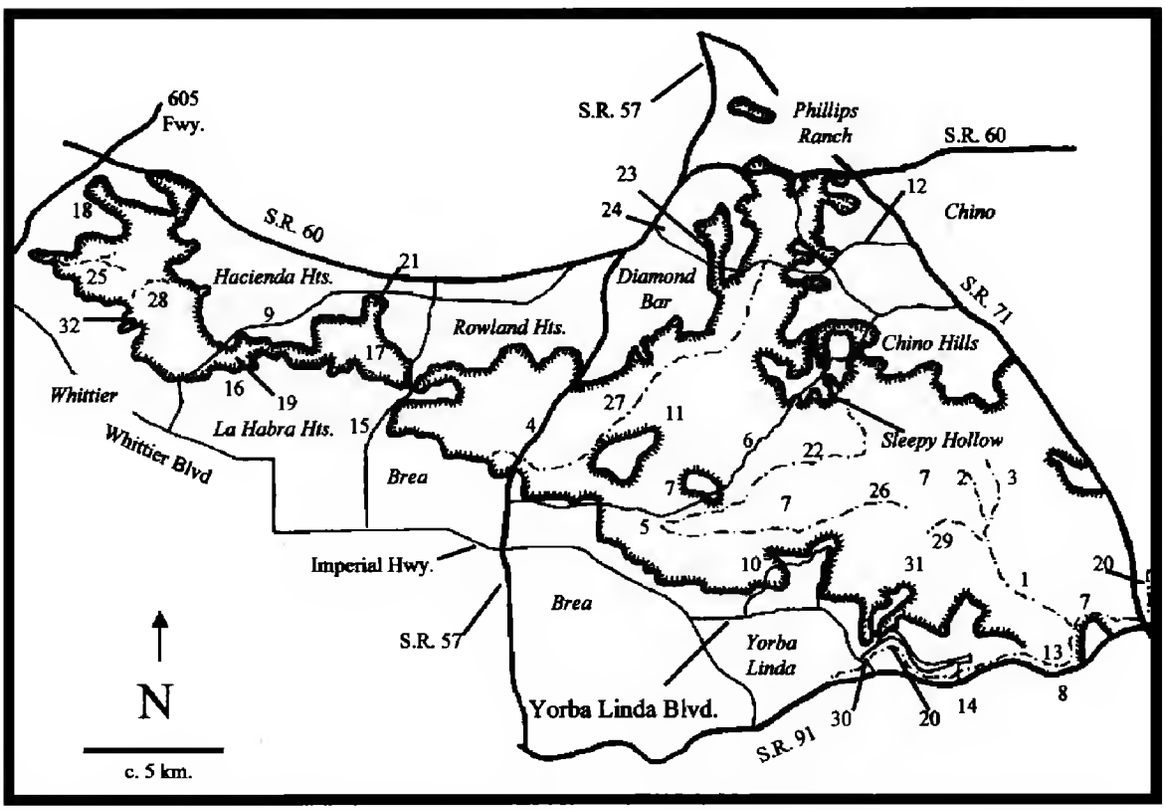

Figure 2. Locations mentioned in the text. 1, lower Aliso Cyn.; 2, upper Aliso Cyn.; 3, Bane Cyn.; 4, Brea Cyn.; 5, Carbon Cyn. Regional Park; 6, Carbon Cyn. Rd.; 7, Chino Hills State Park; 8, Coal Cyn.; 9, Colima Rd.; 10, Fairmont Ave.; 11, Firestone Boy Scout Reserve; 12, Grand Ave.; 13, Green River Golf Course; 14, Gypsum Cyn. Rd.; 15, Harbor Blvd.; 16, Murphy Ranch Park; 17, Powder Canyon Natural Area; 18, Rose Hills Memorial Park; 19, San Miguel Creek; 20, Santa Ana River; 21, Schabarum Park; 22, Soquel Cyn.; 23, Summitridge Park; 24, Sycamore Canyon, Whittier; 25, Sycamore Canyon Park, Diamond Bar; 26, Telegraph Cyn.; 27, Tonner Canyon; 28, Turnbull Cyn.; 29, Water Cyn.; 30, Weir Cyn. Rd.; 31, Wire Springs Trail; 32, Worsham Cyn.

finally succumbing to large-scale residential sprawl. While open-space conservation in the hills is dominated by Chino Hills State Park, local efforts in the Whittier Hills have had some success in protecting and linking parcels west of Harbor Blvd.

Ornithological History

Historical data on breeding birds in the Puente–Chino Hills are sparse. Housed at the Western Foundation for Vertebrate Zoology (WFVZ), Camarillo, the unpublished field notes of Antonin Jay, an egg collector in Whittier during the early 1900s, provide some of the earliest records of nesting species but focus mainly on the San Gabriel River bottom to the west of the Puente Hills. Craigmile (1906) provided a rough sketch of the region's avifauna, though its accuracy was questioned by Grinnell (1906). Early comprehensive distributional works (e.g., Grinnell 1898, Willett 1912, 1933, Grinnell and Miller 1944) mention scattered collection records, generally from established towns on the periphery of the hills such as Whittier. The same may be said for specimens or egg records in various museums.

Students at Rio Hondo College near Rose Hills Memorial Park north of Whittier have conducted regular bird surveys of open space adjacent to their campus since the 1970s (S. Breaux, unpubl. data), and the Whittier Hills have received regular coverage by a handful of dedicated birders since the 1960s (especially L. Schmahl and J. Schmitt). Field work associated with the Orange County Breeding Bird Atlas in the late 1980s (Gallagher 1997) and the Los Angeles County Breeding Bird Atlas in the late 1990s (M. Wimer, unpubl. data) contributed general distributional information on the breeding avifauna of the region, as have several recent publications on Orange County (Hamilton and Willick 1996) and Whittier Narrows (Long 1993). While environmental assessment reports from development projects in the region typically mention just a few common species or focus on the California Gnatcatcher, several consultants (including K. Campbell and J. Pike) contributed significant recent observations for this study.

Plant Communities

The vegetation of the Puente–Chino Hills is a mosaic of scrub, grassland, and woodland. Scrub communities are most widespread, particularly coastal sage scrub dominated by California Sagebrush (*Artemisia californica*), California Buckwheat (*Eriogonum fasciculatum*) and Black Sage (*Salvia mellifera*). This occurs with a shrubby sumac woodland ("Sumac Series" of Sawyer and Keeler-Wolf 1995) dominated by Toyon (*Heteromeles arbutifolia*), Laurel Sumac (*Malosma laurina*), Lemonadeberry (*Rhus integrifolia*) and, except in the Whittier Hills, California Black Walnut (*Juglans californica* var. *californica*). Both coastal sage scrub and sumac woodland are most prevalent along the southern flank of the hills and in the far west. Chaparral, characterized by Chamise (*Adenostoma fasciculatum*), buckthorns (*Ceanothus* spp.) and other frost-tolerant shrubs, is restricted to several high ridges in the north-central and eastern portion of the study area.

Native woodland, dominated by Coast Live Oak (*Quercus agrifolia*) and/or California Black Walnut, is most extensive in the north-central section of the hills and along drainages elsewhere. Woodland-forming groves of planted eucalyptus are scattered throughout and support a subset of native woodland bird species. I distinguish riparian growth of steeper slopes and faster-flowing streams dominated by mature Western Sycamore (*Platanus racemosa*) and Coast Live Oak, with occasional Black Cottonwood (*Populus balsamifera*), as "foothill riparian," that of more level, slower streams, characterized by willows (*Salix* spp.), Fremont Cottonwood (*Populus fremontii*), and thickets of Mulefat (*Baccharis salicifolia*) as "lowland riparian."

The region's grassland is dominated by nonnative plants, including Black Mustard (*Brassica nigra*) and annual grasses (especially *Hordeum*, *Bromus*, and *Avena*), and is most extensive in the central and far eastern portions of the hills. This habitat features scattered patches of native bunchgrasses (e.g., *Nassella pulchra*) and forbs (e.g., *Bloomeria crocea*, *Dichelostemma capitatum*). Hamilton and Willick (1996) provided an overview of the bird communities associated with these habitats.

METHODS

I used a combination of point counts and walking transects. Transects served to reveal inconspicuous and/or nonvocal birds undetected by point counts. Points and transect routes were placed as evenly as possible given access limitations. I sampled each point and transect once between 15 April and 29 May during either 1997 or 1998. A few riparian transects were surveyed later in the year (to 14 June) to minimize detection of migrants.

I made one count (adapted from Ralph et al. 1995) between 0500 and 0930 at 331 points in undeveloped portions of the Puente–Chino Hills. Nearly all points were located within 500 m of each other, but none was closer than 200 m. Point counts lasted 8 minutes, and all birds heard or seen were recorded. The 46 transect surveys (1–4 km long), each done once, involved walking slowly along a road or trail and recording all birds seen or heard within 100 m.

Since this study focused on large-scale patterns of distribution rather than on local abundance, I use only presence/absence data from point counts and transects. No special effort to record breeding evidence was made other than by incidental observation. Flyovers were omitted from analysis, except in the case of raptors, the Turkey Vulture (*Cathartes aura*), American Crow (*Corvus brachyrhynchos*), Common Raven (*Corvus corax*), and several difficult-to-survey taxa including nocturnal species, aerial foragers, and waterbirds. I omit numerical data for these species and obviously nonbreeding species but summarize their known status briefly.

I recorded migratory species as present only if singing, paired, or exhibiting nesting behavior. While these methods may have over- or undercounted certain species, they attempted to minimize rather than eliminate confusion of migrant with breeding birds.

I surveyed both public lands and the few private holdings granting permission to enter. In regions with little public access, point counts and transects were conducted from public roads or public parkland. Several large private holdings were off limits during the study, including most of Tonner Canyon (including the large Firestone Boy Scout Reserve), Brea Canyon (both sides of State Route 57), and much of the grazing land north and east of Chino Hills State Park in the far eastern Chino Hills.

RESULTS

At the end of most species accounts, the first number in parentheses is the percentage of point counts where species recorded as present (n = 331), followed by the percentage of walking transects where detected (n = 46). CHSP, Chino Hills State Park. All observations are mine unless another observer is credited.

Turkey Vulture *Cathartes aura*. Typically observed either soaring over grassland and other open habitats or roosting in eucalyptus and riparian groves in small groups, the largest being about 10 birds in riparian woodland in southern Diamond Bar on 14 May 1998. This species has probably been extirpated as a breeder from the study area, as Gallagher (1997) found none in the Chino Hills during the late 1980s and

M. Wimer (pers. comm.) received no reports of nesting during the Los Angeles County Breeding Bird Atlas. Nevertheless, J. Schmitt observed an adult walking into several cavities on bluffs above Sycamore Canyon north of Whittier on 4 April 1999, near which "tufts of down" clung to shrubs. In several subsequent visits he found no nest or young, but according to the unpublished notes of Antonin Jay, Turkey Vultures nested in this area from 15 March to 29 April, with the "height of the season" being the first two weeks in April. The birds were apparently plastic in their requirements, as Jay wrote, "I have found them nesting in swamps near El Monte (just west of Whittier) under some blackberry vines where the ground was so wet as to stick to your hands and clothes. I have also found them nesting in holes at the base of some gravel banks, under some bushes on steep hillsides, in open situations, and in hollow trees.... The nests are always placed on the southern or eastern side of a hill, and nearly always at the base. . . . The nests . . . are generally found by the white downy feathers which adhere to the weeds." Jay went on to describe the discovery of eight nests in the Puente Hills (no locations) between 1900 and 1903. Although he noted a decline throughout Los Angeles County by the early 1900s, ascribing it to the disappearance of the large cattle and sheep ranches where they fed, he observed (ca. 1905) "still a great many nest and rear their young in the foothills" (3.3, 26.1).

White-tailed Kite *Elanus leucurus*. While single birds were observed widely, the only pair west of State Route 57 was in Powder Canyon Natural Area, Hacienda Heights, where courting on 14 May 1997 (M. San Miguel). Nesting activity was apparently confined to woodland adjacent to extensive grassland: an adult transporting food over State Route 60 to Phillips Ranch, Pomona, on 19 and 20 May 1998; single pairs observed in courtship display along Water Canyon on 7 June 1997; two pairs, including one accompanied by a juvenile, along the Santa Ana River adjacent to Weir Canyon Rd., Yorba Linda, on 19 June 1997. With an estimated maximum of 25 potential breeding territories in all of Orange County during the late 1980s (Gallagher 1997), the birds of the Puente–Chino Hills represent a significant contribution to the regional population (2.1, 19.6).

Northern Harrier *Circus cyaneus*. Very scarce, with evidence of breeding confined to a pair engaged in courtship behavior in upper Tonner Canyon near the Los Angeles/San Bernardino Co. line on 20 May 1997 (confirmed as breeding here later in 1997, B. Daniels). Two other sightings in eastern CHSP (lower Aliso Canyon, 30 July 1997; Wire Springs Tr., 19 May 1997) suggest additional breeding sites. An estimated one pair per year bred successfully in all of Orange County during the late 1980s (Gallagher 1997), and the species does not breed in the extensive habitat of the Prado Basin to the east (*fide* J. Pike), emphasizing the regional importance of the Puente–Chino Hills birds (0.6, 0.0).

Cooper's Hawk *Accipiter cooperii*. Widespread in woodland: pair with calling fledgling(s) within residential development in southern Hacienda Heights on 28 May 1998; juvenile at nest along canyon south of Rowland Heights on 23 April 1997 (M. San Miguel); recently used nest (fresh whitewash and feathers) in mature Coast Live Oak near Tonner Canyon in Diamond Bar on 20 May 1997; distraction behavior by adult along the Santa Ana River near Gypsum Canyon Rd., Yorba Linda, on 14 June 1997; adult in territorial flight (slow, exaggerated wingbeats) near State Route 71 in southeastern city of Chino Hills on 19 April 1998. Elsewhere, pairs noted along Sycamore Canyon on 17 June 1998, adjacent to State Route 60 in Hacienda Heights on 7 May 1997, and in Sleepy Hollow on 11 May 1998 (2.1, 37.0).

Red-shouldered Hawk *Buteo linearis*. This widespread species was recorded in riparian woodland and eucalyptus groves, but direct breeding evidence was limited to a pair with vocal fledgling(s) heard adjacent to an old estate in residential Whittier on 1 May 1997 (1.5, 15.2).

Red-tailed Hawk *Buteo jamaicensis*. By far the most frequently encountered raptor, breeding throughout the hills in tall trees (especially Western Sycamore) and on transmission-line towers (10.3, 71.7).

Golden Eagle *Aquila chrysaetos*. Single birds observed as follows: adult perched on transmission-line tower adjacent to Rose Hills Memorial Park 12 July 1997; adult and immature feeding in grassland south of Rowland Heights 24 May 1997 (M. San Miguel); adult soaring north of upper Aliso Canyon 15 April 1998; adults near Green River Golf Course 13 April 1997 and 3 May 1998, with an apparent pair there 5 May 1998. B. Daniels also noted this species in upper Tonner Canyon during spring 1997. In my study area, the Golden Eagle is believed to breed at only one or two sites, both in or adjacent to CHSP (Gallagher 1997; G. Hund pers. comm.). In the late 1980s, only four nesting sites were known in Orange County, all in virtually inaccessible locations within the Santa Ana Mountains (Gallagher 1997) (0.3, 2.2).

American Kestrel *Falco sparverius*. Found breeding in open habitats near structures or large trees with nest cavities, with one nest placed under the roof of a house adjacent to a golf course in residential La Habra Heights in 1998 (7.9, 41.3).

Prairie Falcon *Falco mexicanus*. One observation, of two flying east over lower Aliso Canyon 22 May 1997. The only potential nest site near the study area is in the northern Santa Ana Mountains of Orange County southeast of the Chino Hills (Hamilton and Willick 1996) (0.3, 0.0).

California Quail *Callipepla californica*. Recorded throughout in all but the smallest fragments of open space and in extensive grassland (33.7, 76.1).

Rock Dove *Columba livia*. Groups of about 10 regularly seen flying high overhead (mainly in Chino Hills); otherwise confined to urban areas (0.0, 0.0).

Band-tailed Pigeon *Columba fasciata*. Sparingly recorded at urban edge along the northern fringe of the hills (Whittier to Diamond Bar) (0.0, 6.5).

Spotted Dove *Streptopelia chinensis*. Single birds recorded incidentally near downtown Whittier in 1997 and in Phillips Ranch, Pomona, in 1999 (0.0, 0.0).

Mourning Dove *Zenaida macroura*. Common throughout (24.1, 84.8).

Common Ground-Dove *Columbina passerina*. Incidentally observed in two areas of remnant citrus orchards: lower Carbon Canyon and along the Santa Ana River in eastern Yorba Linda (0.0, 0.0).

Yellow-billed Cuckoo *Coccyzus americanus*. Not recorded during study, though it historically bred in riparian woodland along the Santa Ana River (Schneider 1900) and along the San Gabriel River into the 1950s (Long 1993). With a very few (1–5) pairs summering in the extensive riparian woodland of the Prado Basin (Pike 1997), limited recolonization within the study area along the Santa Ana River is conceivable.

Greater Roadrunner *Geococcyx californianus*. Though widespread in coastal sage scrub and grassland, it was most commonly observed in extensive coastal sage scrub on northern edge of Brea/Yorba Linda, where one to four birds were encountered each morning spent in the habitat (4.9, 15.2).

Barn Owl *Tyto alba*. Recorded in Whittier Hills, Diamond Bar, and city of Chino Hills, but probably occurs widely.

Western Screech-Owl *Otus kennicottii*. Two family groups were recorded in Sycamore Canyon on 7 May 1997 during a pre-dawn survey. J. Schmitt reports successful nesting from both nest boxes and natural cavities along Sycamore Canyon (four territories) and Telegraph Canyon (five territories) during the late 1990s, and L. Schmahl found at least three breeding pairs in Turnbull Canyon during spring 1995,

with young observed on 6 June. This species also nests in boxes placed along Carbon Canyon (C. Campbell) and was heard calling in the riparian woodland along the Santa Ana River in 1991 (J. Pike).

Long-eared Owl *Asio otus*. Unrecorded during this study, though a small population apparently persists just to the east in mature willow woodland of the Prado Basin (*fide* J. Pike). Since apparently suitable nesting habitat (oak savannah, riparian thickets within grassland) exists throughout the Chino Hills, it is possible that focused surveys could turn up this species here.

Great Horned Owl *Bubo virginianus*. Incidentally observed in scattered wooded sites, including eucalyptus groves. Fledgling encountered in a sycamore-lined canyon south of Hacienda Heights on 20 May 1998, and L. Schmahl mentions six birds, including a begging juvenile, just north of Turnbull Canyon on 27 August 1996. J. Pike noted three recently used nests in the bluffs on the north side of the Santa Ana River in 1991.

Burrowing Owl *Athene cunicularia*. Common in the far eastern Chino Hills prior to the mid-1980s (pers. obs.), this species was last recorded in the early 1990s along Bane Canyon (C. Schlotterbeck, M. A. Patten). Frequent surveys in suitable habitat between CHSP and State Route 71 during spring and summer 1999 (K. F. Campbell) found none, although a handful remain in the Prado Basin just to the east (J. Pike). It is invariably found in large sparsely vegetated parcels of land, most of which have been developed. This species may be a very rare transient through the hills, as J. Schmitt observed the fresh remains of two killed by a raptor in Sycamore Canyon on 23 October 1999, apparently the first record for the Whittier Hills since at least the 1960s (*fide* J. Schmitt) (0.0, 0.0).

Lesser Nighthawk *Chordeiles acutipennis*. One record during study, of a single bird flushed from heavily grazed grassland with clumps of Coast Goldenbush (*Isocoma menziesii*) south of Rowland Heights on 11 June 1997. Other records include a single bird observed recently (no date) along a transmission-tower road in northeast CHSP (A. Ing) and another in the Whittier Hills on 6 April 1994 (L. Schmahl). Hamilton and Willick (1996) mentioned a remarkable record of "many dozens" observed by M. A. Patten on 13 April 1980 in Telegraph Canyon, but given the lack of recent records from the Santa Ana River and adjacent Prado Basin (*fide* J. Pike), it seems likely these were migrating birds.

Common Poorwill *Phalaenoptilus nuttallii*. Unrecorded during this study, though L. Schmahl observed a single bird just south of Turnbull Canyon on 20 April 1996, C. Campbell mentions recent records from Carbon Canyon, and K. F. Campbell noted a single bird in the city of Chino Hills between CHSP and State Route 71 in 1999.

White-throated Swift *Aeronautes saxatalis*. Nests widely and abundantly on anything resembling a cliff face, including freeway overpasses. Well over 100 pairs nested under State Route 57 at Tonner Canyon in 1997.

Black-chinned Hummingbird *Archilochus alexandri*. Occurs mainly in riparian vegetation but also recorded in urban areas, perhaps owing to hummingbird feeders and ornamental vegetation (7.3, 67.4).

Anna's Hummingbird *Calypte anna*. Common throughout in shrubby habitats, especially at the urban interface (39.1, 87.0).

Costa's Hummingbird *Calypte costae*. Like the Greater Roadrunner's, the center of this species' abundance apparently lies in solid stands of coastal sage scrub along the hills' southeastern flank (Brea/Yorba Linda), though it was widely recorded in low scrub and grassland throughout, including on the urban edge and in isolated patches of scrub adjacent to larger blocks of open space (e.g., within Diamond Bar and the city

of Chino Hills). This species may have decreased recently, as I found it scarce in the Whittier Hills, where it outnumbered Anna's before 1970 (J. Schmitt pers. comm.) (14.3, 15.2).

Allen's Hummingbird *Selasphorus sasin*. Most reliably found in flowering eucalyptus and Cape Honeysuckle (*Tecomaria capensis*) at the urban interface and common in riparian and adjacent scrub west of State Route 57, particularly near patches of Tree Tobacco (*Nicotiana glauca*). Breeding evidence includes a single nest found in willows along Telegraph Canyon on 26 May 1997 (C. Campbell) and pairs engaged in courtship displays along the urban interface in Whittier on 1 May 1997 (nest building observed here 21 May 1995, L. Schmahl) and in La Habra Heights on 28 May 1998. This species has bred in the area since at least 1989, when a nest was found in residential Whittier (D. Heindel). Though breeding-season aggregations at flowering Tree Tobacco were common in the open space of the Whittier Hills, the species went virtually unrecorded in interior of the more expansive Chino Hills farther east (3.3. 15.2).

Acorn Woodpecker *Melanerpes formicivorus*. Found exclusively in association with Coast Live Oak, including trees integrated into urban development. Loosely colonial when breeding, and unrecorded over large areas of apparently suitable habitat (e.g., portions of Hacienda Heights and La Habra Heights) (7.0, 34.8).

Nuttall's Woodpecker *Picoides nuttallii*. Common in woodland and riparian habitats, including sumac woodland and eucalyptus groves (21.3, 93.5).

Downy Woodpecker *Picoides pubescens*. Restricted to two habitats: tall lowland riparian forests (e.g., Carbon Canyon and Santa Ana River) and mature ornamental trees in some urban areas such as Whittier, where small numbers have apparently bred for years (L. Schmahl). K. F. Campbell encountered this species in oak–walnut woodland in Rowland Heights during spring 1999 (1.5, 8.7).

Northern Flicker *Colaptes auratus*. Sparsely distributed throughout, confined to stands of Western Sycamore or other large trees with cavities. A pair near an apparent nest hole in a eucalyptus grove in extreme northeast Whittier on 21 May 1998 suggests at least limited acceptance of nonnative vegetation (1.8, 19.6).

Western Wood-Pewee *Contopus sordidulus*. Singing birds and apparent pairs found in mature foothill and lowland riparian woodlands into June throughout the study area. While the lateness of this species' migration (Garrett and Dunn 1981) makes it difficult to separate breeders from transients (or non-breeding summer residents), breeding was confirmed in the late 1980s in western CHSP (Gallagher 1997). Nest searches and surveys later in the summer would be needed to assess its local breeding status and distribution (1.2, 4.3).

Willow Flycatcher *Empidonax traillii*. Obvious migrants were recorded into mid-June, including individuals singing in grassland and coastal sage scrub. The only territorial bird found was apparently unpaired, though remaining for several weeks during May and June 1998 along lower Aliso Canyon (A. Ing). Other recent records of possibly breeding birds are of one along the Santa Ana River near Gypsum Canyon Road on 25 June 1999 and another (the same?) about 400 meters east 21 July 1999 (K. F. Campbell). Like the Yellow-billed Cuckoo, this species maintains a small remnant population in the Prado Basin (Pike pers. comm.).

Pacific-slope Flycatcher *Empidonax difficilis*. Singing birds recorded in shady riparian woodland and in dense eucalyptus and exotic pine groves at the urban interface (especially La Habra Heights and Hacienda Heights). Active nests noted on 7 May 1997 along Sycamore Canyon (J. Schmitt) and on 8 June 1997 along Turnbull Canyon, both north of Whittier. Although the species' range has recently spread in the

coastal lowlands of southern California (P. Unitt pers. comm.), the Puente–Chino Hills were undoubtedly a historical nesting area, with eggs collected in Turnbull Canyon in 1938 (WFVZ) (4.0, 50.0).

Say's Phoebe *Sayornis saya*. A widespread breeder in grassland and grassy coastal sage scrub, though unrecorded from the Whittier Hills. Virtually all nesting was associated with artificial habitats (e.g., large water tanks) on the urban interface. An apparent nest under eaves of a house adjacent to San Miguel Creek on 30 April 1997 and in 1998 (J. Schmitt) was the westernmost breeding locale during the study, although in 1999 L. Schmahl found a pair nesting at Rose Hills Memorial Park north of Whittier, the first nesting record for Whittier since the early 1900s (Long 1993, *fide* J. Schmitt). Gallagher (1997) discussed this species' recent reestablishment (or rediscovery) as a breeder in Orange County (5.7, 15.2).

Black Phoebe *S. nigricans*. Common in riparian and urban habitats (16.1, 70.9).

Ash-throated Flycatcher *Myiarchus cinerascens*. Noted throughout in woodland, including sumac woodland and eucalyptus groves (24.6, 80.4).

Cassin's Kingbird *Tyrannus vociferans*. Found in tall eucalyptus groves adjacent to open habitats, including golf courses (L. Schmahl in litt.) (3.0, 10.9).

Western Kingbird *Tyrannus verticalis*. Sparsely distributed in savanna-like habitats (2.1, 15.2).

Loggerhead Shrike *Lanius ludovicianus*. Though apparently one of the most common breeding birds in the Los Angeles Basin prior to urbanization (e.g., Grinnell 1898, Swarth 1900, Willett 1933), now known only from scattered records in overgrazed and otherwise sparsely vegetated areas. The largest group (up to seven pairs; C. Brady) was found in CHSP along upper Aliso Canyon, where the birds apparently nest in naturalized thistles (*Cirsium* sp.). Two other small colonies (2–5 pairs each) were in an area of horse stables and pastureland along English Rd. in eastern city of Chino Hills (two pairs on 19 May 1997, including adults feeding a juvenile) and east of Harbor Blvd. between Rowland Heights and Brea (two birds on 30 May 1998). Breeding records elsewhere: adults with food entering a nest in tall Black Mustard at Rose Hills Memorial Park on 18 April 1998; a nest with four eggs in a large Mexican Elderberry (*Sambucus mexicana*) along San Miguel Creek on 30 April 1997 (J. Schmitt), and, before the study, a juvenile along Worsham Canyon just southeast of Turnbull Canyon on 9 June 1996 (L. Schmahl). This species went undetected in the Santa Ana River portion of the study area in 1997 and 1998 and on extensive surveys there in spring and summer 1991 (*fide* J. Pike) (0.9, 8.7).

Bell's Vireo *Vireo bellii*. Though historically numerous in willow thickets throughout southern California, breeding in the study area is now largely confined to two small populations in extensive willow and Mulefat thickets, one in Carbon Canyon Regional Park, the other along the Santa Ana River. At the latter site, M. San Miguel noted singing birds from the spillway of Prado Dam west to Green River Golf Course on 15 May 1997, although K. F. Campbell observed five singing birds west to Weir Canyon Road in 1999 (0.6, 4.3). Elsewhere, A. Ing found two pairs feeding young along upper Aliso Canyon in summer 1998, and I noted one singing male in lower Aliso Canyon 3–8 May 1998 and two along the west side of State Route 71 adjacent to the Prado Basin 19 April 1998. Bell's Vireos may be more widespread than detected in the numerous willow-lined gullies east of CHSP (e.g., four singing between the park and State Route 71 during 1999, K. F. Campbell). A lone singing male in Schabarum Park, Hacienda Heights, on 12 June 1998 did not remain to breed.

Hutton's Vireo *Vireo huttoni*. Found in woodland and foothill riparian habitat throughout, west to Sycamore and Turnbull canyons. Birds in mature eucalyptus

groves on the urban edge (e.g., three at Murphy Ranch Park, Whittier, on 16 May 1998 and one at Hollow Run Park, city of Chino Hills, on 19 May 1998) suggest limited acceptance of nonnative woodland (4.0, 30.4).

Warbling Vireo *Vireo gilvus*. I found a few singing birds and pairs in riparian woodland, generally in association with tall willows and oaks near flowing water. Records of singing birds after 10 June, when most migrants have passed through, include two in Sycamore Canyon on 17 June 1998 and two in Schabarum Park on 12 June 1998. K. F. Campbell (pers. comm.) mentions six to eight singing birds "through the season" in 1999 along the Santa Ana River between Green River Golf Course and Weir Canyon Road. More surveys would be needed to confirm breeding (0.9, 13.0).

Western Scrub-Jay *Aphelocoma californica*. Common resident throughout (36.8, 91.3).

American Crow *Corvus brachyrhynchos*. Common in urban areas adjacent to study area but rarely encountered more than 1 km from the urban edge (5.5, 21.7).

Common Raven *Corvus corax*. Apparently replaces American Crow away from the urban interface. Nests found in live oaks and on transmission towers (17.3, 50.0).

Horned Lark *Eremophila alpestris*. Localized in barren grassland, with singing birds noted incidentally on three areas cleared for housing within the city of Chino Hills on 20 April 1997 and 18 May 1997. I noted only a single bird in the grazing land south of Rowland Heights (8 May 1997), but K. F. Campbell and D. Guthrie (pers. comm.) mention recent summer records from this area. A flock of about 50 in late summer 1997 in heavily grazed upper Tonner Canyon may have been a postbreeding concentration. Like the Loggerhead Shrike, this species has drastically declined in the region, having been a common breeder in the Whittier Hills during the late 1960s and early 1970s (J. Schmitt pers. comm.) (0.3, 0.0).

Tree Swallow *Tachycineta bicolor*. I observed no indication of breeding during this study, and Gallagher (1997) reported none through the Orange County breeding-bird atlas, but J. Pike saw six entering cavities in snags along the Santa Ana River near the Green River Golf Course during spring and summer 1991.

Violet-green Swallow *Tachycineta thalassina*. Aside from occasional individuals in mixed foraging flocks on overcast days, I encountered a pure flock of about 50 along Turnbull Canyon on 8 June 1997. Although the species nested at this site during the early 1990s (L. Schmahl), I observed no evidence of breeding there. A small group nested recently in a cliff face along Carbon Canyon Rd. (Gallagher 1997, C. Campbell).

Northern Rough-winged Swallow *Stelgidopteryx serripennis*. Nests commonly on structures, exposed rock faces, and barren land-slips.

Cliff Swallow *Hirundo pyrrhonota*. Locally abundant at the urban interface, nesting under overpasses and eaves of newer houses with little obstructing vegetation.

Barn Swallow *Hirundo rustica*. Single pairs presumably nesting near the urban edge in Sycamore and Telegraph canyons. I also observed a pair entering a probable nest site just north of the study area at Queen of Heaven Cemetery, Rowland Heights, on 30 May 1997. The species is probably more widespread around flood-control structures away from the hills, as K. F. Campbell noted "at least 8 pairs" in storm drains in eastern city of Chino Hills in 1999.

Oak Titmouse *Baeolophus inornatus*. Restricted to the eastern Puente and western Chino hills (unrecorded west of Harbor Blvd.), encountered in mature oak and riparian woodland, pure willow thickets within grassland, and shrubby walnut woodland. This species bred formerly in the Whittier Hills (eggs collected in Turnbull

Canyon 1940, WFVZ) but apparently disappeared following a large fire (J. Schmitt pers. comm.), with the last breeding-season record from Sycamore Canyon on 14 April 1970 (L. Schmahl) (4.0, 39.1).

Bushtit *Psaltriparus minimus*. Common resident, especially near the urban interface (29.2, 91.3).

White-breasted Nuthatch *Sitta carolinensis*. Unrecorded during survey, though known to breed sparingly at comparable elevations in the Santa Ana Mountains to the south (Gallagher 1997). A pair encountered incidentally on 3 September 1997 in mature walnut woodland south of Rowland Heights may have dispersed from elsewhere. This species apparently summers irregularly along Telegraph Canyon (C. Campbell), with nesting confirmed in 1993 (Gallagher 1997). It may breed in foothill riparian woodland of larger canyons not surveyed during this study, particularly Tonner and Soquel (0.0, 0.0).

Cactus Wren *Campylorynchus brunneicapillus*. Noted in extensive patches of cactus (*Opuntia* spp.) throughout, particularly where surrounded by extensive coastal sage scrub. Birds were regularly encountered at the urban interface and in cactus patches surrounded by or adjacent to houses (e.g., Phillips Ranch, Pomona). Sites overrun with nonnative grasses are apparently avoided. The birds rapidly recolonized burned habitat in Schabarum Park. I observed nests nearly everywhere I recorded the birds (7.9, 15.2).

Rock Wren *Salpinctes obsoletus*. Though Hamilton and Willick (1996) mentioned a "minor concentration" in the Chino Hills, I found none during this study. Though a small population may exist in the lightly surveyed ranchland east of CHSP, this wren is probably only a rare nonbreeding visitor throughout the hills (0.0, 0.0).

Canyon Wren *Catherpes mexicanus*. One or possibly two birds heard singing on 5 May 1998 in wind-eroded cliffs above the Santa Ana River opposite Coal Canyon in eastern Yorba Linda. May be slightly more widespread in the extreme southeastern Chino Hills, but much of this habitat is inaccessible. A record from the Whittier Hills in April 1990 (L. Schmahl) apparently pertains to a vagrant (0.3, 0.0).

Bewick's Wren *Thryomanes bewickii*. Common resident throughout, except in extensive grassland. Occurs locally in adjacent urban areas (59.0, 84.8).

House Wren *Troglodytes aedon*. Common in woodland and riparian growth with trees large enough to provide nesting cavities. Like Bewick's Wren, occurs locally in urban areas (44.4, 80.4).

California Gnatcatcher *Polioptila californica*. Probably present historically the entire length of the hills, with egg records extending from Sycamore Canyon (until 1995, M. Wimer, unpubl. data) to Diamond Bar (early 1900s, WFVZ). Now found in two main areas: the border of Whittier and La Habra Heights between Colima Rd. and Murphy Ranch Park, and the south-central flank of the hills in northern Brea and northwestern Yorba Linda, from State Route 57 east to Fairmont Ave. Both populations occur in extensive dense (nongrassy) coastal sage scrub dominated by California Sagebrush growing on gentle slopes, with larger shrubs such as Mexican Elderberry and Laurel Sumac widely scattered. A single bird observed in coastal sage scrub in the city of Chino Hills northeast of CHSP on 27 April 1999 (K. F. Campbell) suggests the existence of a third population. This record is especially notable, as Davis et al. (1998) cited no records from the Chino Hills in their review of California Gnatcatcher records in San Bernardino County.

Although the western group is now relatively secure on designated open space, the eastern group is located in a rapidly developing region. I did not record the species in CHSP, although A. Ing has recently found a few, including an active nest, along the southwestern edge of the park adjacent to Yorba Linda.

Here near the northwest edge of its range, this species persists also in the San Jose Hills to the north and the Montebello Hills to the west (*fide* K. Garrett) but has been nearly extirpated from San Bernardino County (Davis et al. 1998) and Ventura County (*fide* W. Wehtje). It is possible that continued recovery of sage scrub vegetation in CHSP may allow this species to increase in the region (0.9, 4.3).

Blue-gray Gnatcatcher *Polioptila caerulea*. My only record was of a single calling bird, possibly an early fall migrant, in coastal sage scrub on 22 August 1997 just north of Turnbull Canyon. Gallagher (1997) mentioned an anomalous record of two or three in coastal sage scrub on 14 May 1985 in Carbon Canyon Regional Park, which matches closely an observation of a family of California Gnatcatchers (J. Schmitt pers. comm.). This species nests primarily at higher elevations in the Santa Ana Mountains (Gallagher 1997), although breeding has been noted in the San Joaquin Hills in coastal Orange County at elevations comparable to the Puente–Chino Hills (Hamilton and Willick 1996), and I recently found summering birds in walnut woodland west of the study area in the low Repetto Hills of northeastern Los Angeles (0.0, 0.0).

Western Bluebird *Sialia mexicana*. Apparently confined to a handful of breeding groups in oak, riparian, and eucalyptus woodland, west to Powder Canyon. Numbers undoubtedly augmented by nest boxes placed along the Santa Ana River at Green River Golf Course, Carbon Canyon Regional Park (see Gallagher 1997), and Summitridge Park (0.9, 8.7).

Swainson's Thrush *Catharus ustulatus*. The few May and June records of singing birds came from three widely scattered sites: Sycamore Canyon, near Phillips Ranch in Pomona, and upper Aliso Canyon. Like that of other late migrants, its breeding status in the area is not well addressed by my study. Historically a common breeder in lowland riparian tangles (Willett 1933, A. Jay unpubl. notes), this species maintains a "small but apparently stable population" in Prado Basin (J. Pike pers. comm.). Singing birds have summered recently at long-urbanized sites within the Los Angeles Basin such as San Marino (pers. obs.) and Wilmington (*fide* K. Garrett) (0.3, 2.2).

American Robin *Turdus migratorius*. Mainly confined to lush vegetation of urban parks and golf courses, especially where riparian habitat occurs with irrigated lawns. A singing male in willows along lower Carbon Canyon on 13 May 1997 was the only indication of breeding away from the urban interface, although K. F. Campbell found small numbers breeding along the Santa Ana River west of State Route 71 in 1999. This species became established in the coastal lowlands of Los Angeles County between 1950 and 1980 (see Grinnell and Miller 1944, Garrett and Dunn 1981) but did not begin breeding in the lowlands of coastal Orange County until the early 1980s (see Gallagher 1997) (3.0, 10.9).

Wrentit *Chamaea fasciata*. Common resident throughout in scrub, riparian thickets, and open woodland with brushy understory. Unrecorded in exotic plantings at urban interface (60.5, 76.1).

Northern Mockingbird *Mimus polyglottos*. Resident throughout in shrubby habitats, particularly at the urban interface (28.3, 16.9).

California Thrasher *Toxostoma redivivum*. Common resident in scrub, riparian thickets, and open woodland with brushy understory. Like the Wrentit, absent from exotic vegetation (33.7, 80.4).

European Starling *Sturnus vulgaris*. Away from urban areas, found nesting mainly in areas of extensive woodland (therefore scarce along the southern flank of the hills) and concentrated along the urban interface (9.4, 41.3).

Phainopepla *Phainopepla nitens*. Singing birds and pairs widesprad in woodland (including sumac woodland) and foothill riparian habitats (12.5, 41.3).

Orange-crowned Warbler *Vermivora celata*. Widespread in woodland and riparian thickets, including sumac woodland. While many April and May records may pertain to migrants, singing birds were detected through early June. Singing males were also recorded locally through May in lush plantings on the urban interface, especially in La Habra Heights (7.3, 19.6).

Yellow Warbler *Dendroica petechia*. Highest densities of singing males from mid-May through early June were in mature lowland riparian woodland, primarily along the Santa Ana River, in lower Carbon Canyon, and along Bane and Aliso canyons. Scattered singing birds also recorded into June in larger canyons elsewhere (e.g., Sycamore, Powder, and Tonner), but records of singing birds after 10 June limited to the Santa Ana River (2.4, 15.2).

Common Yellowthroat *Geothlypis trichas*. Recorded (including fledglings) in grassland, riparian thickets, and at seeps with tall grasses such as Giant Wild Rye (*Leymus condensatus*) within scrub and open woodland (17.9, 47.8).

Yellow-breasted Chat *Icteria virens*. Singing or paired birds during May and June noted locally in lowland riparian thickets (especially of Mulefat and Mexican Elderberry adjacent to grassland) throughout study area. Evidence of breeding was limited to a bird carrying food in eastern Telegraph Canyon on 28 May 1997 and a male delivering a flight song along lower Aliso Canyon on 3 May 1998. Birds singing birds in atypical habitats such as mustard and Tree Tobacco were within about 20 m of riparian habitat (5.2, 19.6).

Spotted Towhee *Pipilo maculatus*. Common resident throughout; less tolerant of urbanization than the California Towhee, though common in lush exotic plantings at the urban edge (71.7, 93.5).

California Towhee *Pipilo crissalis*. Common resident throughout, including in adjacent urban areas (64.4, 95.7).

Rufous-crowned Sparrow *Aimophila ruficeps*. Recorded throughout in treeless grassy scrub and nearly pure grassland, provided singing perches were available. Often recorded in pairs, though direct evidence of breeding limited to an adult accompanied by a juvenile south of Rowland Heights on 30 May 1997 (17.0, 39.1).

Black-chinned Sparrow *Spizella atrogularis*. I found only a single small colony (<10 birds), in tall coastal sage scrub (mainly California Sagebrush) along Wire Springs Trail. One bird singing in similar habitat in the Whittier Hills along San Miguel Creek for one day (30 April 1997, J. Schmitt) was apparently a migrant. Two birds singing from cactus-rich coastal sage scrub near Sycamore Canyon on 27 June 1999 (J. Schmitt) and nestings in the early 1990s near Turnbull Canyon (L. Schmahl) suggest occasional breeding elsewhere. The species may occur also in large tracts of scrub along middle Carbon, Soquel and Tonner canyons, which I could not survey thoroughly. Historical locations for egg sets include Diamond Bar (1963, WFVZ). This is species is locally common in the Santa Ana Mountains south of the study area (R. A. Hamilton pers. comm.) (0.3, 2.2).

Lark Sparrow *Chondestes grammacus*. Range coincident with both extensive grassland and grazing, the birds occupying large unvegetated patches of land near shrubs or small trees. Several pairs were found in sparse exotic vegetation of new suburban development adjacent to grazing land, the males using roofs as singing perches. Like the Oak Titmouse and Costa's Hummingbird, the Lark Sparrow was not found in the far west (Whittier Hills) or the far northeast of the study area (Phillips Ranch, Pomona) despite the seemingly suitable conditions there (4.0, 13.0).

Sage Sparrow *Amphispiza belli*. The only one recorded during my study was a single juvenile in heavily grazed coastal sage scrub north of Brea on 24 May 1997 (M.

San Miguel), although a small population apparently persists in coastal sage scrub between Yorba Linda and Telegraph Canyon in and adjacent to oil fields (A. Ing). K. F. Campbell recorded "several" there in spring and summer 1999. In western Riverside and San Bernardino counties (e.g., Jurupa Hills) Sage Sparrows occur in sagebrush-dominated coastal sage scrub growing on gravelly ground not overrun by exotic grasses (pers. obs.), a highly localized habitat in the study area. Even more localized than the Black-chinned Sparrow in the Santa Ana Mountains, the Sage occurs mainly in extensive stands of Chamise (R. A. Hamilton pers. comm.), helping explain its rarity in the study area. Like the Black-chinned, the Sage Sparrow may persist in unsurveyed chaparral in Carbon, Soquel, and Tonner canyons (0.0, 2.2).

Grasshopper Sparrow *Ammodramus savannarum*. Mainly restricted to extensive grassland east of Powder Canyon, with several pairs breeding in 1995 and 1996 above Turnbull Canyon (L. Schmahl). Loosely colonial, generally recorded in groups of two to five singing males. Though this species favors native grassland (e.g., Gallagher 1997), and I found several groups in patches of Purple Needlegrass (*Nasella pulchra*) surrounded by extensive nonnative grassland (e.g., lower Aliso Canyon and just east of Powder Canyon), it uses other habitats too, both ungrazed and grazed. The former were wild oats (*Avena* spp.) mixed with Black Mustard (e.g., Bane Canyon, CHSP) and grassy (recently burned?) coastal sage scrub with well-spaced California Sagebrush, sages (*Salvia* spp.), California Buckwheat, and Laurel Sumac along Wire Springs Trail. The latter were sparse scrub of Coast Goldenbush south of Rowland Heights and a marshy area of nonnative grasses and forbs including thistles (*Cirsium* spp.), along upper Tonner Canyon at Grand Avenue. Birds in pure grassland (both grazed and ungrazed) were generally found only where dry mustard stems or scattered subshrubs provided singing perches but did not form a contiguous thicket (7.0, 6.5).

Song Sparrow *Melospiza melodia*. Common resident in shrubby vegetation throughout, nesting widely in dense plantings of adjacent urban areas (69.3, 93.5).

Black-headed Grosbeak *Pheucticus melanocephalus*. Common in woodland throughout, recorded locally in lush exotic vegetation near urban interface (41.3, 69.6).

Blue Grosbeak *Guiraca caerulea*. Recorded in extensive grassland, grassy coastal sage scrub, and in lowland riparian thickets adjacent to these habitats. More intensive surveys may be required to ascertain whether birds singing in nonriparian habitat are actually breeding (14.3, 30.4).

Indigo Bunting *Passerina cyanea*. L. Schmahl observed an apparently territorial subadult male just south of Turnbull Canyon from 3 June to 7 July 1995. This species has apparently bred in very small numbers in the Prado Basin since 1986 (J. Pike) and has increased recently as a breeder throughout California (Rowe and Cooper 1997) (0.0, 0,0).

Lazuli Bunting *Passerina amoena*. The largest groups were encountered in the eastern Chino Hills and in grazed grassland with patches of Coast Goldenbush south of Rowland Heights. This species probably breeds locally throughout the study area; L. Schmahl has noted regular nesting sites west to Turnbull Canyon (9.1, 8.7).

Red-winged Blackbird *Agelaius phoeniceus*. Generally recorded in small groups in mesic grassland (2.4, 8.7).

Tricolored Blackbird *Agelaius tricolor*. One breeding colony (about 50 pairs in May 1997) at a stock pond and adjacent marsh in upper Tonner Canyon at Grand Avenue.

Western Meadowlark *Sturnella neglecta*. Like the Grasshopper Sparrow, restricted to extensive grassland and grassy coastal sage scrub, primarily east of Powder

Canyon. The only meadowlarks west of here were <10 summering (1997 and 1998) on the mustard-covered portion of Rose Hills Memorial Park (12.5, 17.4).

Brewer's Blackbird *Euphagus cyanocephalus*. Away from purely urban sites, this species was found only on the urban interface and along the Santa Ana River, mainly in association with cattle (0.6, 10.9).

Brown-headed Cowbird *Molothrus ater*. Common throughout, particularly in riparian and woodland habitats (15.2, 80.4).

Hooded Oriole *Icterus cucullatus*. Breeding birds restricted to exotic plantings (especially palms and eucalyptus) near the urban interface (6.4, 10.9).

Bullock's Oriole *Icterus bullockii*. Common in tall woodland and riparian habitats throughout, accepting urban situations with tall shade trees (17.3, 58.7).

House Finch *Carpodacus mexicanus*. Common resident throughout, particularly at the urban edge (33.1, 58.7).

Purple Finch *Carpodacus purpureus*. An irregularly common winter visitant with an anomalous spring record of a single singing male in Carbon Canyon Regional Park on 13 May 1997 (J. Schmitt), where the species is not known to breed (C. Campbell pers. comm.). In 1998 J. E. Pike confirmed nesting in nearby Prado Basin (*Field Notes* 52:504, 1998). More extensive surveys in foothill riparian woodland, particularly after flight years, could yield breeding records, as Hamilton and Willick (1996) mentioned spring and summer records from foothill canyons of southern Orange County (0.0, 0.0).

Lesser Goldfinch *Carduelis psaltria*. Common resident throughout, particularly in urban areas (14.3, 67.4).

Lawrence's Goldfinch *Carduelis lawrencei*. Probably a scarce and irregular breeder in riparian sites surrounded by dry, open habitats. Only three records during this study: a singing male along a sycamore-lined canyon south of Rowland Heights on 23 April 1997 (M. San Miguel); three birds (including a singing male) at a willow-lined pond adjacent to the Western Hills Country Club north of Sleepy Hollow on 18 May 1997; a single bird along lower Aliso Canyon on 22 May 1997. K. F. Campbell observed a pair in riparian vegetation within heavily grazed grassland in the city of Chino Hills on 14 June 1999, and C. Campbell (in Gallagher 1997) reported nest building in Telegraph Canyon on June 1990. Eggs were collected in Turnbull Canyon in 1938 (WFVZ) (0.3, 4.3).

American Goldfinch *Carduelis tristis*. Found in lowland riparian thickets dominated by willows, breeding locally in residential plantings in Whittier (L. Schmahl) (0.9, 13.0).

House Sparrow *Passer domesticus*. Absent away from the urban edge and the immediate vicinity of structures (1.5, 4.3).

Nutmeg Mannikin *Lonchura punctulata*. Widely naturalized along flood-control channels in the Los Angeles area (pers. obs.), but my only sighting during this study was of three recently fledged juveniles in Hollow Run Park, city of Chino Hills, on 19 May 1998 (0.0, 0.0).

DISCUSSION

Historical Changes

Ecological relaxation, the gradual replacement of a diverse ecological community by a few widespread species (see Soulé et al. 1988, Bolger et al. 1997), may be happening in outlying portions of the Puente–Chino Hills.

This process is most likely in coastal sage scrub and grassland, where I found the Costa's Hummingbird, Say's Phoebe, Grasshopper Sparrow, and Western Meadowlark to be locally common east of Powder Canyon yet virtually absent in the Whittier Hills and in Phillips Ranch, Pomona.

Of the major plant communities, grassland may have declined most within the Puente–Chino Hills, the result of both residential encroachment and the reestablishment of woody plants following the removal of grazing. Judged from historical photographs and accounts (e.g., Freudenberger et al. 1987), woody vegetation in the Puente–Chino Hills was much sparser during the early 1900s when grazing dominated the landscape. Livestock are now eliminated from the western Puente Hills and from Chino Hills State Park (both since early 1990s, *fide* L. Schmahl), although grazing remains heavy in portions of the eastern Puente and Chino Hills east of Powder Canyon.

With this change in land use, species dependent on a dense understory, such as the Song Sparrow and California Quail, may be more numerous now than they were during the height of grazing 100 years ago, whereas species associated with barren land, such as the Loggerhead Shrike, Western Kingbird and Horned Lark, have probably declined greatly as breeders in the hills since that time (Swarth 1900, Craigmile 1906, Willett 1933). Aside from the recent loss of Burrowing Owls, however, the grassland bird community appears remarkably intact, at least in the eastern Puente and Chino Hills.

Though coastal sage scrub has been drastically reduced in its global extent, its distribution in the study area may have actually increased at the expense of grassland during the past century. Nevertheless, several of its birds (e.g., the Costa's Hummingbird) have become scarce or absent in the outlying portions of the Puente Hills. Components of its distinctive bird community (including the California Gnatcatcher and Cactus Wren) represent remnants of a far wider former distribution in the Los Angeles area. Birds typical of the rocky alluvial-fan scrub probably once extensive on the southeastern flank of the hills and along the Santa Ana River before it was channelized (e.g., the Lesser Nighthawk, Rock Wren, Sage Sparrow) have declined greatly.

I surveyed too little chaparral to assess its birds' current status, though the small amount in the hills does not appear to support a bird community distinct from that of the much more extensive coastal sage scrub and sumac woodland. Not surprisingly, the characteristic chaparral avifauna of the nearby Santa Ana Mountains (see Hamilton and Willick 1996) was poorly represented, with characteristic breeding species like the Blue-gray Gnatcatcher absent and Black-chinned and Sage sparrows nearly so.

Lowland riparian woodland was probably never widespread in the study area, particularly during the period of heavy grazing. Still, channelization for flood control and development along the Santa Ana River in the far southeast has doubtless reduced the number of riparian bird species within the study area, reflecting trends throughout southern California (see Garrett and Dunn 1981). By contrast, foothill riparian areas have been widely spared from nearby development (e.g., Sycamore Canyon north of Whittier and Sycamore Canyon Park, Diamond Bar), in part because development of canyons is physically and legally difficult, in part doubtless also because of aesthetic considerations. Aided by oak-tree ordinances, woodlands continue

to receive protection, though often as isolated remnants within residential development.

The number of woodland bird species in the hills is somewhat reduced in comparison with that of oak woodland within the Santa Ana and San Gabriel mountains (Garrett and Dunn 1981, Hamilton and Willick 1996). The species present, including the Pacific-slope Flycatcher, Hutton's Vireo, Western Bluebird, and Oak Titmouse, all nest regularly in appropriate habitat throughout the Los Angeles Basin. The woodland species that are absent, including the Hairy Woodpecker (*Picoides villosus*), White-breasted Nuthatch, Chipping Sparrow (*Spizella passerina*), Dark-eyed Junco (*Junco hyemalis*), and Purple Finch, are generally infrequent breeders at elevations below 800 m south of Ventura County (Unitt 1984, Hamilton and Willick 1996, Gallagher 1997).

Without more precise historical data, it is difficult to say whether these "missing" woodland species were ever regular breeders in the hills. It is worth noting, however, that the foothill plant community of the hills is also depauperate in comparison to that at similar elevations in the surrounding ranges. Several trees and shrubs of nearby foothill woodland are apparently absent, including California Bay (*Umbellularia californica*), manzanita (*Arctostaphylos* spp.), Big-leaved Maple (*Acer macrophyllum*), Canyon Live Oak (*Quercus chrysolepis*), and Holly-leaved Cherry (*Prunus ilicifolia*) (pers. obs.). This suggests that the hills have always had a reduced foothill flora, a pattern probably mirrored by their avifauna.

Conservation

Large areas of contiguous open space within the Puente–Chino Hills remain in private hands, susceptible to residential development. Some of these lands were surveyed during this study, mainly from public roads, while others were completely off limit to public access. I suggest three sites for highest conservation concern for birds in the region, owing to their large size, their unprotected status, and the large number of declining species they support (Table 1).

The coastal sage scrub of northern of Brea and Yorba Linda along the southern flank of the hills from just east of Harbor Blvd. in the west to Fairmont Ave. in the east (area "A," Figure 3) currently supports the richest assemblage of sage-scrub specialists like the California Gnatcatcher, Cactus Wren, and Greater Roadrunner, and perhaps the only population of the Sage Sparrow. With oil fields currently giving way to new housing developments, some reduction in the sage-scrub specialists is inevitable here, since intact sage scrub and its associated birds are scarce within nearby Chino Hills State Park (pers. obs.). Efforts by Shell Oil to develop a habitat-conservation plan (A. Ing pers. comm.) and the designation of this area as a "subregional planning area" under California's Natural Communities Conservation Plan offer hope for some level of conservation.

The second area of concern is the extensive grassland south of Rowland Heights (area "B"), located mostly on property owned by Shell Oil in unincorporated Los Angeles County, which represents the largest contiguous grassland west of Chino Hills State Park. While smaller regions of grassland throughout the study area, such as the Whittier Hills, support a few

Table 1 Sensitive Breeding Birds of the Puente–Chino Hills

Species	Estimated Abundance[a]	Location[b]		
		A	B	C
White-tailed Kite	2		K	K
Golden Eagle	1		K	K
Northern Harrier	1		P	K
Burrowing Owl	X		P	P
Greater Roadrunner	4	K	K	K
Lesser Nighthawk	X		K	P
Bell's Vireo	3		P	P
Loggerhead Shrike	3	K	K	L
Horned Lark	3		K	K
Rufous-crowned Sparrow	4	K	K	K
Cactus Wren	4	K		K
California Gnatcatcher	3	K		
Yellow-breasted Chat	3	K	P	K
Blue Grosbeak	4	K	K	K
Grasshopper Sparrow	4	K	K	K
Sage Sparrow	2	K		
Tricolored Blackbird	4[c]			K
Western Meadowlark	4	K	K	K

[a]1, one or two breeding pairs known; 2, three to ten pairs; 3, 10–50 pairs; 4, >50 pairs; X, extirpated or irregular breeder.

[b]A, north Brea/northwest Yorba Linda; B, grassland and savanna south of Rowland Heights; C, Upper Tonner Canyon. K, known to occur; L, likely (known from adjacent areas); P, possible (suitable habitat present).

[c]Breeds at only this site in the study area.

pairs of species like the Grasshopper Sparrow or Lazuli Bunting, these and other grassland birds are abundant here. Although some of this habitat is included within Shell's habitat-conservation plan, much of the grassland and oak savanna along the northern edge of the site is being replaced by gated housing tracts (pers. obs.). Unfortunately, it may be too late to protect these northern parcels, since the development of most was approved years ago and is only now taking place (J. Yann pers. comm.).

The third area is the unprotected grassland along upper Tonner Canyon straddling the Los Angeles/San Bernardino County boundary in the extreme northeast (area "C"). The most significant open space lies within San Bernardino on an active cattle ranch, visible from Grand Ave. Extending from near State Route 60 south to the eastern edge of the Firestone Boy Scout Reserve, this area includes a freshwater marsh (at Grand Ave.) that supports the only pair of the Northern Harrier and colony of the Tricolored Blackbird known in the study area. Other raptors nesting locally, including the Golden Eagle and White-tailed Kite, regularly forage here during the breeding season, and all the characteristic grassland birds occur.

Smaller areas of that support rare species and are threatened by development include the foothill riparian woodland of Turnbull Canyon and adjacent

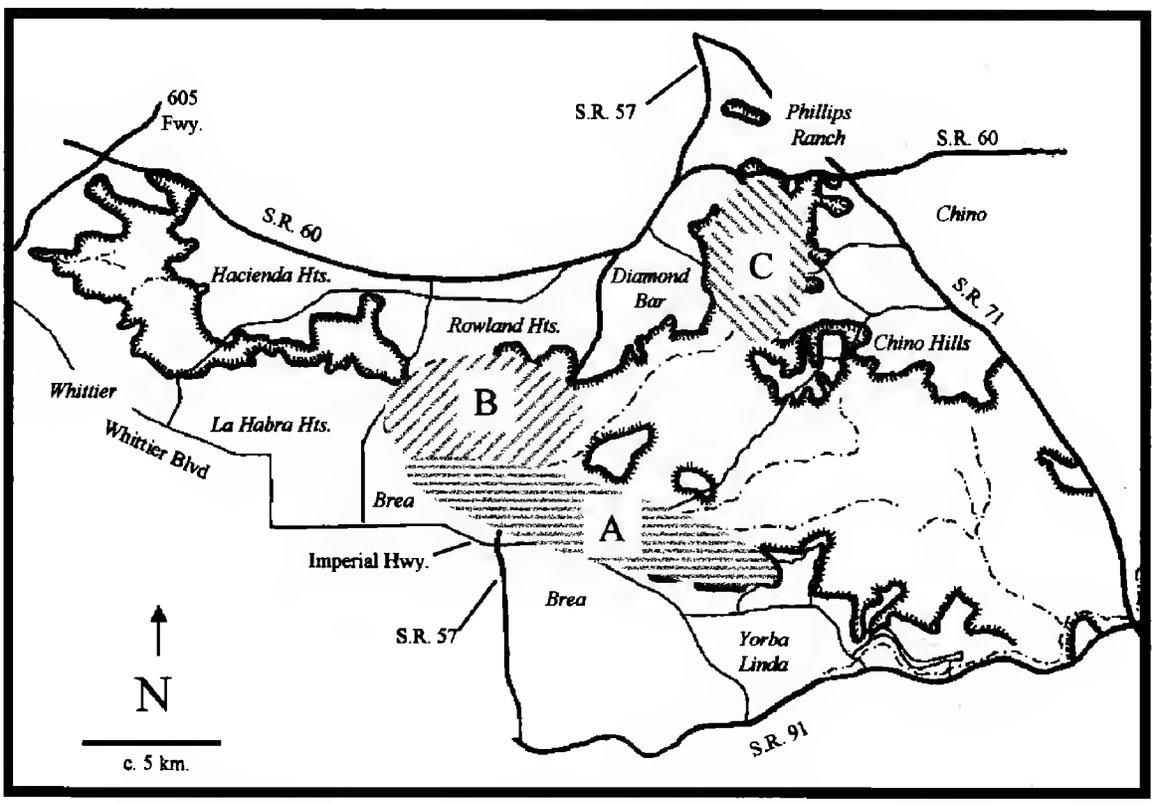

Figure 3. Areas in the Puente–Chino Hills of highest conservation concern (see text).

grassland, Summitridge Park and adjacent coastal sage scrub, the pastureland of the eastern city of Chino Hills, particularly along English Rd., and the remaining open space along the Santa Ana River through Yorba Linda, important foraging habitat for several riparian birds such as the White-tailed Kite).

Access for this study was denied in several areas of the hills, yet most of these sites support habitats duplicated (and surveyed) elsewhere. One of the most interesting undersurveyed regions is the ranchland north and east of Chino Hills State Park, where recent sightings of the locally rare Loggerhead Shrike and Bell's Vireo (K. F. Campbell) indicate additional populations and the rediscovery of the Burrowing Owl remains a possibility. Surveys of the extensive chaparral east of State Route 57 (including the Firestone Boy Scout Reserve and Soquel Canyon) could turn up additional populations of the Black-chinned Sparrow and Sage Sparrows. A more thorough assessment of the the sycamore-lined canyon bottoms in these same areas would probably also reveal nesting sites for scarce riparian breeders like the Warbling Vireo and Western Wood-Pewee. Recent efforts by the Santa Monica Mountains Conservancy to purchase a portion of Firestone Boy Scout Reserve are encouraging, provided plans to locate major highways through this region and Chino Hills State Park are abandoned (C. Schlotterbeck pers. comm.). The feasibility of extending the state park should be investigated.

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LITERATURE CITED

Beier, P. 1995. Dispersal of juvenile cougars in fragmented habitat. J. Wildlife Mgmt. 59:228–237.

Bolger, D. T., Scott, T. A., and Rotenberry, J. T. 1997. Breeding bird abundance in an urbanizing landscape in coastal southern California. Cons. Biol. 11:406–421.

Craigmile, E. 1906. Common birds of Whittier, California. Wilson Bull. 18:83–87.

Davis, L. H., McKernan, R. L., and Burns, J. S. 1998. History and status of the California Gnatcatcher in San Bernardino County, California. W. Birds 29:361–365.

Freudenberger, D. O., Fish, B. E., and Keeley, J. E. 1987 Distribution and stability of grasslands in the Los Angeles Basin. Bull. S. Calif. Acad. Sci. 86:13–26.

Gallagher, S. R. 1997. Orange County, California, Atlas of Breeding Birds. Sea and Sage Press, Irvine, CA.

Garrett, K., and Dunn, J. 1981. Birds of Southern California: Status and Distribution. Los Angeles Audubon Soc., Los Angeles.

Grinnell, J. 1898. Birds of the Pacific slope of Los Angeles County. Pasadena Acad. Sci. Publ. 2.

Grinnell, J. 1906. Why should it have been printed? Condor 8:156–157.

Grinnell, J., and Miller, A. H. 1944. The distribution of the birds of California. Pac. Coast Avifauna 27.

Hamilton, R. A., and Willick, D. R. 1996. The Birds of Orange County, California: Status and Distribution. Sea and Sage Press, Irvine, CA.

Long, M. C. 1993. Birds of Whittier Narrows Recreation Area, Los Angeles County, California. Whittier Narrows Nature Center Associates, 1000 N. Durfee Ave., South El Monte, CA 91733.

Ralph C. J., Droege, S., and Sauer, J. R. 1995. Managing and monitoring birds using point counts: Standards and applications, in Monitoring bird populations by point counts (C. J. Ralph, S. Droege, and J. R. Sauer, tech. eds.), pp. 161–170. Gen. Tech. Rep. PSW-GTR-149. Pacific Southwest Research Station, U.S. Forest Service, Albany, CA.

Rothstein, S. I. 1994. The cowbird invasion of the Far West: History, causes, and consequences experienced by host species. Studies Avian Biol. 15:301–315.

Rowe, S. P., and Cooper, D. S. 1997. Confirmed nesting of Lazuli Bunting with Indigo Bunting in Kern County, California. W. Birds 28:225–227.

Sawyer, J., and Keeler-Wolf, T. 1995. A Manual of California Vegetation. Calif. Native Plant Soc., Sacramento.

Schneider, F. B. 1900. Nesting of the California Cuckoo in Los Angeles County. Condor 2:34.

Soulé, M. E., Bolger, D. T., Alberts, A. C., Wright, J., Sorice, M., and Hill, S. 1988. Reconstructed dynamics of rapid extinctions of chaparral-requiring birds in urban habitat islands. Cons. Biol. 2:75–92.

Swarth, H. S. 1900. Avifauna of a 100-acre ranch. Condor 2:14–16, 37–41.

Unitt, P. 1984. The birds of San Diego County. San Diego Soc. Nat. Hist. Memoir 13.

Willett, G. 1912. Birds of the Pacific slope of southern California. Pac. Coast Avifauna 7.

Willett, G. 1933. A revised list of the birds of southwestern California. Pac. Coast Avifauna 21.

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Hutton's Vireo

Sketch by Marni Fylling

BREEDING BIOLOGY OF LUCY'S WARBLER IN SOUTHWESTERN NEW MEXICO

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ABSTRACT: We found Lucy's Warblers breeding abundantly in mid-elevation broadleaf riparian forests in the lower Gila River valley of southwestern New Mexico. They arrived *en masse* in the third week of March. Patterns of singing suggested that Lucy's Warblers might raise two broods. Few were heard or seen after late July. Estimated population densities ranged from 1.7 to 3.3 territories per ha, and Lucy's Warblers constituted up to 10% of the total bird territories in our study plots. We found 24 nests placed in cavities or behind loose bark. Large cottonwoods and willows were the preferred nesting substrates. Nesting success was high (83%). We found only two nests that had been parasitized by cowbirds but observed five pairs feeding fledgling cowbirds.

Lucy's Warbler (*Vermivora luciae*) is the smallest and probably the least known of North American wood warblers. It shares with the Prothonotary Warbler (*Protonotaria citrea*) the trait, unusual for parulids, of cavity nesting. Most of what is known about Lucy's Warbler, summarized by Johnson et al. (1997), relates to the lowland (<1000 m elevation) of Arizona, where it is considered a specialist of mesquite (*Prosopis* spp.) bosques. It also occurs in cottonwood–willow, sycamore (*Platanus wrightii*), tamarisk (*Tamarix ramosissima*), and mixed broadleaf riparian communities, and in lesser numbers in mesquite-dominated upland scrub (Szaro and Jakle 1985, Curson et al. 1994, Johnson et al. 1997). Although most abundant at lower elevations, the species ranges up to 1700 m or more.

Lucy's Warbler is assumed to be a recent arrival to New Mexico, being first recorded in the state in 1907 (Gilman 1908). It was first noted in the San Francisco River valley in 1926 (Hubbard 1978) and the lower Gila valley in 1928 near Redrock, where a nest was found (Ligon 1961). From 1929 to 1937, several additional New Mexico specimens were collected along the Gila River (Mellinger and Stewart 1940), including some near our study sites. Currently it breeds commonly along watercourses in the southwestern quadrant of the state (Ligon 1961, Hubbard 1971, Baltosser 1986, American Ornithologists' Union 1998). Almost all of its habitat in the state lies at middle elevations (1000–2000 m), where mesquite constitutes only a minor component of riparian bosques (Dick-Peddie 1991).

Johnson et al. (1997: 12) stated "Population numbers are diminishing throughout breeding range because of losses of riparian habitat from water projects and cutting of mesquites throughout sw U.S." However, Breeding Bird Survey results suggest that although some portions of its range have experienced population declines, others have shown stable or increasing trends (Sauer et al. 1997). Although not formally recognized as threatened, the species is on the watchlist of Partners in Flight (http://www.audubon.org/

bird/watch). Effective management requires a sound knowledge base, but the lack of information on this species from habitats other than mesquite highlights the need for basic natural history information from such areas. In this paper we present information on the arrival and departure dates, population trends, timing of breeding, population density, and nest sites of Lucy's Warblers from mid-elevation riparian woodlands on the Gila River in southwestern New Mexico.

METHODS

Study Sites

We studied Lucy's Warbler in two portions of the Gila River valley in Grant County, New Mexico. The Cliff–Gila study site lies between the towns of Cliff and Gila, at an average elevation of 1380 m. Most of this valley is privately owned agricultural land used primarily for grazing and irrigated hay farming. The river and nearby earthen irrigation ditches are flanked by corridors of mostly mature (canopy 16–35 m tall) riparian forest. The Gila National Forest study site (GNF), elevation 1326 m, is located about 13.5 km downstream from Cliff and consists of a corridor along the Gila River that varies from about 0.4 km to 1.2 km in width. The river at this site is bordered by riparian communities of various ages and hillside woodland (Rea 1972).

Dominant tree species in both areas are Fremont Cottonwood (*Populus fremontii*), Goodding's Willow (*Salix gooddingii*), and Arizona Sycamore (*Platanus wrightii*). Subcanopy species include Boxelder (*Acer negundo*), Arizona Walnut (*Juglans major*), Velvet Ash (*Fraxinus velutina*), Arizona Alder (*Alnus oblongifolia*), Netleaf Hackberry (*Celtis reticulata*), Russian Olive (*Elaeagnus angustifolia*), and Texas Mulberry (*Morus microphylla*). Early successional patches are composed primarily of Seepwillow (*Baccharis glutinosa*) and Coyote Willow (*Salix exigua*). The eastern edge of the GNF census area includes a dry, rocky hillside, intersected by side canyons, supporting scattered piñon pines (*Pinus edulis*), Shrub Live Oak (*Quercus turbinella*), Honey Mesquite (*Prosopis glandulosa*), and One-seeded Juniper (*Juniperus monosperma*).

Census Techniques

Line Transects. To measure the relative abundance of Lucy's Warblers, we conducted simple line transects from 1 January 1997 to 15 October 1999 at the GNF study site (Bibby et al. 1992). We established two 2.5-km variable-width transects (Ralph et al. 1993) by dividing the GNF site in half. Lucy's Warblers were detected along each transect by visual observation, vocalizations, or both. We assumed Lucy's Warblers could be detected up to approximately 200 m from the transects. We censused the upper transect from mid-May 1997 to December 1999, the lower transect from mid-May 1998 to December 1999. Each transect was censused once a week during the breeding season (May to mid-July) and biweekly at other times of the year, except from 1 January to 1 May 1999, when censuses were conducted weekly as well. To minimize variability, all censuses began within 15 minutes of sunrise, followed the same route, were traversed at a constant rate of 0.8 km/

hour, and were conducted by the same observer (Bibby et al. 1992, Ralph et al. 1993). We recorded all birds detected on a field map and recorded number, species, and whether the detection was by sight or sound. Unidentified calls were recorded on a Sony TCM-59V tape recorder for later verification. Singing patterns were characterized by dividing the number of singing Lucy's Warblers by the total number detected on any given census day.

Spot Mapping. We estimated the population density of Lucy's Warbler in six riparian forest patches (average area 4 ha) at the Cliff–Gila site using a combination of spot mapping and nest searches (Bibby et al. 1992). Three patches were adjacent to the Gila River itself, three were adjacent to irrigation ditches. In each patch, we flagged grids of 30.5-m squares that varied in size and configuration with patch size and shape. We mapped each plot 10–12 times during the season, approximately every 2 or 3 days from late May through June 1997–1999. Spot-mapping sessions began within 15 minutes of dawn at a different random corner of the grid each time and lasted 2 to 5 hours (Bibby et al. 1992). All Lucy's Warbler detections were marked on daily maps for later transfer to a master map. We searched for nests on a daily basis after spot-mapping sessions and plotted nests on master maps. From the master maps we estimated the number of breeding territories and density per patch for each year.

Nest Sites. For all nests found, we recorded tree species, size (height and diameter at breast height), condition of tree (alive or dead), nest height and type (cavity or behind bark), and distance to closest surface water and closest edge of habitat patch. To assess whether Lucy's Warblers prefer specific tree species for nesting, we calculated relative abundance of tree species within study patches to compare usage with availability. We counted woody stems within a 0.02-ha plot (radius 8 m) centered on a random selection of 140 spot-mapping grid points. Counts were limited to stems >15 cm diameter, as this was the minimum size warblers used for nesting in our sample. The relative availability of a particular tree species was calculated as the total number of trees of a particular species divided by the total number of all trees. We used chi-square analyses on arcsine-transformed data to compare the proportions of used versus available stems of each tree species. We compared distances to edge and surface water between nests and random points using Mann–Whitney *U* tests.

Nesting Success. Nests were monitored every 5–7 days. We considered nests successful if they fledged one or more young, failed if nests became inactive and no fledglings were sighted in the territory. When possible, we examined failed nests for evidence of depredation or nest parasitism, although direct inspection was not possible for deep cavities.

RESULTS

Temporal Patterns

Lucy's Warbler consistently arrived *en masse* in the lower Gila Valley in the third week of March (Figure 1). Early arrival dates for 1997, 1998, and 1999 were 21, 22, and 24 March, respectively. The number detected peaked early (late April to mid May) and then declined. Few birds were

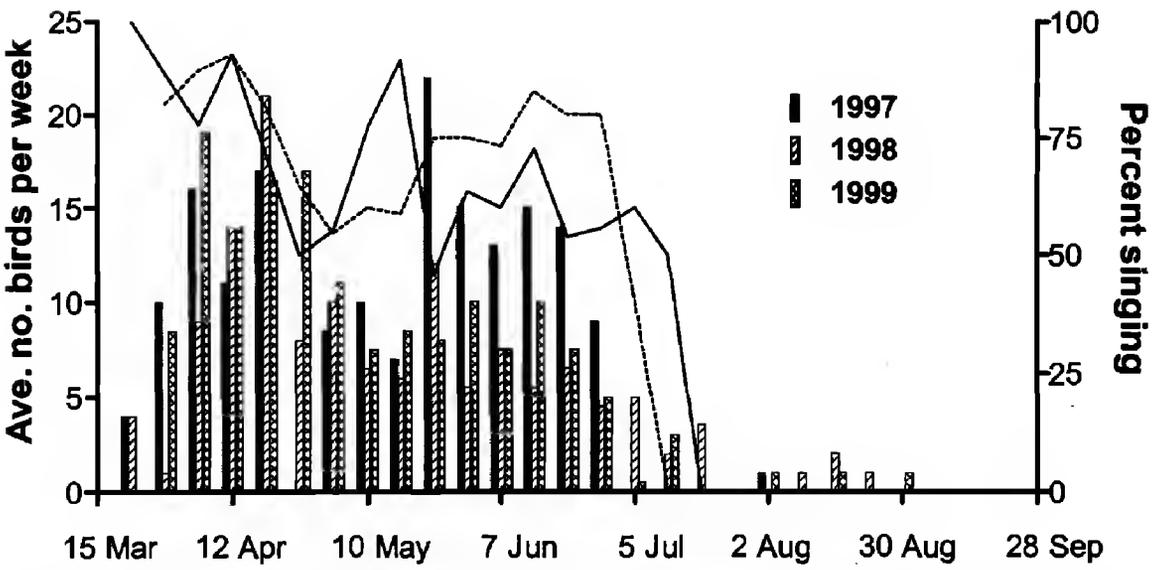

Figure 1. Average numbers of Lucy's Warblers detected on weekly censuses of the Gila National Forest study site, 1997–1999 (bars). Lines indicate the percentage of birds detected that were singing in 1998 (solid line) and 1999 (dashed line).

detected after the first week in July. The proportion of birds singing showed at least two peaks, one from late March to early April, another in late June (Figure 1). An additional peak was noted in early May 1998 but was not detected in 1999. The dates of last detection for 1997, 1998, and 1999 were 2, 18, and 27 August, respectively. Most warblers stopped vocalizing approximately the first week of July (Figure 1), but individuals were detected singing as late as 18 August. Owing to their small size and tendency to remain silent after breeding, they were more difficult to detect in late summer than earlier in the year.

Population Density

Lucy's Warbler was one of 50 species breeding in the study patches but constituted from 3.7% to 10.1% of all territories in each patch (mean 7.2%). The estimated number of territories per patch was not correlated with patch size (Spearman $r_s = -0.60$, $p = 0.24$). The estimated average density over three years ranged from 1.7 to 3.3 pairs/ha (mean 2.3 ± 0.7 pairs/ha). Total breeding-bird densities in these patches ranged from 21.8 to 36.0 pairs/ha (Stoleson and Finch unpubl. data). Patches with higher densities of Lucy's Warbler tended to have a more closed canopy and more mature trees than patches with lower densities.

Population Trends

We found no evidence to suggest that populations of Lucy's Warblers are declining in the lower Gila River Valley. There was no significant difference in the number of Lucy's Warblers detected for the years 1997–1999 on the GNF upper transect according to a nested ANOVA ($F = 0.26$; df = 2, 36; $p = 0.77$). Our estimates of population densities from 1997 to 1999 were higher (1.7 to 3.3 pairs/ha) than the 0.8 pairs/ha Baltosser (1986) reported from a spot-mapping study on an adjacent site in 1975.

Nest Sites

We located 24 nests within our spot-mapping plots in three years. Nests were placed in two types of locations: in cavities (n = 13) and behind bark (n = 11). Most cavities used for nesting were natural; the one exception was an old nest hole excavated by a Ladder-backed Woodpecker (*Picoides scalaris*). Of 24 nests, 19 were placed in live trees. Of these, 11 nests were placed in dead limbs, of which seven were broken. All five nests in dead trees were in broken limbs or trunks. We found nests in three tree species: Goodding's Willow (n = 10), cottonwood (n = 9), and Boxelder (n = 5). Use of willow and cottonwood was proportionally higher than their occurrence. In contrast, Boxelder and other species were under-utilized (χ^2 = 31.1, df = 3, $p < 0.0001$; Figure 2). At the GNF site, a pair nested in a natural cavity in an Arizona Sycamore.

Lucy's Warblers chose nest cavities that were relatively close to the ground (median height 5.0 m), although most nest trees were large in diameter (Table 1). Nest trees less than 5 m in height tended to be large, leaning willows. Placement of nests within patches did not appear to be related to water or edge. We found no significant differences between nest trees and random points in average distance to open water (30.7 ± 40.0 vs. 48.8 ± 57.1 m; U = 1621.0, p = 0.25) or average distance to habitat edge (12.2 ± 8.9 vs. 11.4 ± 9.9 m; U = 2030.0, p = 0.23).

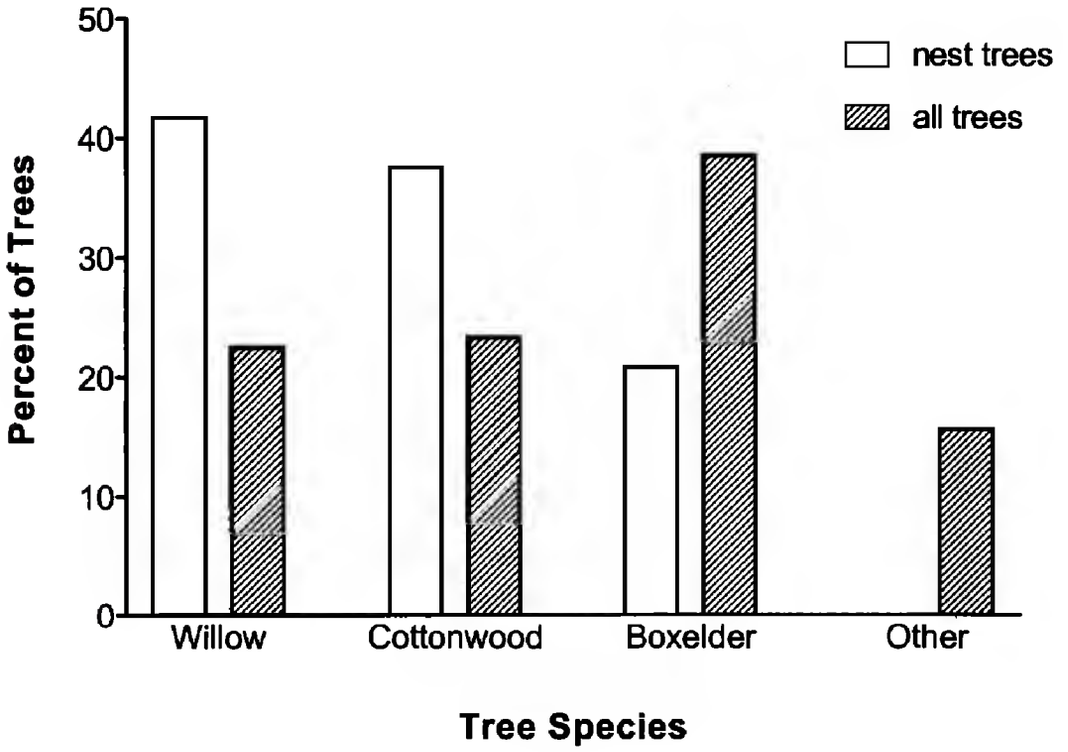

Figure 2. Tree species used as substrates for 24 Lucy's Warbler nests compared to availability of all trees >15 cm diameter within 140 randomly located 0.02-ha plots. Lucy's Warblers used cottonwood and willow more, and Boxelder and other species less, than expected from their availability within the study area (χ^2 = 31.1, df = 3, $p < 0.0001$).

Table 1 Characteristics of 24 Lucy's Warbler Nests in the Lower Gila River Valley of New Mexico, 1997–1999

Nest characteristic	Mean	SD[a]	Range
Height of nest (m)	6.2	4.6	0.9–17.5
Height of nest tree (m)	17.2	9.8	3.0–34.0
Diameter of nest tree (cm)	75.8	51.9	14.0–196.0
Distance from nest to nearest open water (m)	30.7	40.0	0–150
Distance from nest to nearest edge of habitat (m)	12.2	8.9	1–40

[a]SD, standard deviation.

Nesting Success

Lucy's Warblers enjoyed high rates of nest success. Of 23 nests of known outcome, 19 (83%) successfully produced one or more fledglings. We found two nests parasitized by Brown-headed Cowbirds (*Molothrus ater*), but neither fledged young of either species. Both parasitized nests were located behind loose bark. We observed one or two pairs of warblers feeding cowbird fledglings each year but never located their nests.

DISCUSSION

Lucy's Warblers consistently arrived in the Gila River Valley in the third week of March, making them among the first migrant birds to arrive (Shook unpubl. data). Following the fledging of their last broods, Lucy's tended to become silent. Consequently, we do not know when they migrate from the study area, but few were detected after late July.

Lucy's Warbler is suspected of regularly raising two broods (Johnson et al. 1997). Without color banding we were unable to verify whether individual birds reared multiple broods. However, we observed at least two peaks in singing in each of the two breeding seasons, which perhaps correspond to the raising of two broods.

Lucy's Warbler was one of the most abundant breeding species in our Cliff–Gila study areas, comprising up to 10% of the bird territories within a forest patch. The species is known for its high breeding densities. Estimates range from 25 to 500 pairs/40 ha in mesquite-dominated habitats (Johnson et al. 1997), 26 to 48 pairs/40 ha in cottonwood–willow habitats, and 31.6 to 49.5 pairs/40 ha in mixed broadleaf habitats (Carothers et al. 1974, Stamp 1978, Baltosser 1986). In our mixed broadleaf forest plots, Lucy's Warbler densities ranged from 66 to 131 pairs/40 ha, the highest recorded from native nonmesquite habitats.

Lack of correlation between number of territories per forest patch and patch size implies nonrandom distribution within patches. More likely, birds were clumped in particular microhabitats. For example, in 1999 two pairs simultaneously occupied opposite sides of a single clump of large willows, while nearby areas of Boxelder had no warblers. Lucy's Warbler appears to

be dependent on such large trees for suitable nesting cavities. Nonrandom use of different tree species for nesting indicates that not all species are equally suitable. The under-utilization of Boxelder, sycamore, and ash may reflect the fewer nest sites offered by these relatively smooth, thin-barked trees. In contrast, cottonwood and willow have thick, coarse bark and tend to attain much larger girths than the other tree species. Thus, preferred microhabitats within the Gila River valley probably have more large cottonwoods and Goodding's Willows, fewer Boxelders, ashes, or sycamores, and fewer small trees than sites not used by this bird. This clear habitat preference contradicts the statement by Dunn and Garrett (1997) that Lucy's Warbler shuns mature cottonwood–willow associations.

We suggest that healthy populations of this warbler can be encouraged through management practices that not only protect riparian habitats but also promote a variety of age classes of willow and cottonwood. In particular, large trees, including snags, should be retained to provide a supply of suitable nest sites.

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LITERATURE CITED

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Balltosser, W. D. 1986. Seasonal analysis of a southwestern New Mexico riparian bird community. W. Birds 17:115–131.

Bibby, C. J., Burgess, N. D., and Hill, D. A. 1992. Bird Census Techniques. Academic Press, London.

Carothers, S. W., Johnson, R. R., and Aitchison, S. W. 1974. Population structure and social organization of southwestern riparian birds. Am. Zool. 14:97–108.

Curson, J., Quinn, D., and Beadle, D. 1994. Warblers of the Americas: An Identification Guide. Houghton Mifflin, Boston.

Dick-Peddie, W. A. 1991. New Mexico Vegetation: Past, Present and Future. Univ. of N. M. Press, Albuquerque.

Dunn, J. L., and Garrett, K. L. 1997. A Field Guide to Warblers of North America. Houghton Mifflin, Boston.

Gilman, M. F. 1908. Birds of the Navajo Reservation in New Mexico. Condor 10: 146–152.

Hubbard, J. P. 1971. The summer birds of the Gila Valley, New Mexico. Nemouria 2:1–35.

Hubbard, J. P. 1978. Revised checklist of the birds of New Mexico. N. M. Ornithol. Soc. Publ. 6.

Johnson, R. R., Yard, H. K., and Brown, B. T. 1997. Lucy's Warbler, *Vermivora luciae*, in The Birds of North America (A. Poole and F. Gill, eds.), no 318. Acad. Nat. Sci., Philadelphia.

Ligon, J. S. 1961. New Mexico Birds and Where to Find Them. Univ. of N. M. Press, Albuquerque.

Mellinger, E. O., and Stewart, P. A. 1940. The Lucy Warbler in New Mexico. Condor 42:263–264.

Ralph, J. C., Geupel, G. R., Pyle, P., Martin, T. E., and DeSante, D. F. 1993. Handbook of field methods for monitoring landbirds. USDA Forest Service, Pacific Southwest Research Station Gen. Tech. Rep. PSW-GTR-144.

Rea, J. 1972. Management plan: The Gila River Bird Habitat management unit. USDA Forest Service, Gila National Forest, Silver City Ranger District (order from Gila National Forest, 3005 Camino del Bosque, Silver City, NM 88061).

Sauer, J. R., Hines, J. E., Gough, G., Thomas, I., and Peterjohn, B. G. 1997. The North American Breeding Bird Survey results and analysis, version 96.4. Patuxent Wildlife Research Center, Laurel, MD.

Stamp, N. E. 1978. Breeding birds of riparian woodland in south-central Arizona. Condor 80:64–71.

Szaro, R. C., and Jakle, M. D. 1985. Avian use of a desert riparian island and its adjacent scrub habitat. Condor 87: 511–519.

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NOTES

HISTORICAL REVIEW OF ARIZONA'S NESTING NORTHERN HARRIERS, INCLUDING THE MOST RECENT CONFIRMED NESTING IN 1998

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The Northern Harrier (*Circus cyaneus*) is a widespread but locally distributed breeder in North America, ranging from Alaska across Canada to central Quebec and southern Newfoundland, south to Baja California, northern Texas, and Virginia (excluding many eastern states; MacWhirter and Bildstein 1996). It nests primarily in grassy marshes, both salt and fresh, wet prairie with tall grasses, in areas intermixed with woody growth, and also in agricultural areas (MacWhirter and Bildstein 1996, American Ornithologists' Union 1998). In the southwestern USA the species' breeding range includes the southern portions of Nevada, Utah, and Colorado and portions of California, New Mexico, and Texas. In northern Arizona its breeding is occasional or localized (MacWhirter and Bildstein 1996, AOU 1998). Here we summarize the few historical nesting records of Northern Harriers in Arizona since 1872 and report the first known nesting by the species in the state in more than a decade.

To determine the extent of Northern Harrier observations in Arizona, we reviewed museum records, historical accounts, and other publications, including the reports of the Arizona Bird Committee (Speich and Parker 1973, Speich and Witzeman 1975, Rosenberg and Witzeman 1998) and the seasonal summaries in *American Birds* and its permutations *Audubon Field Notes*, *Field Notes*, and *North American Birds* from 1947 to 1999. We contacted professional and competent lay persons with knowledge of the species in Arizona, especially those who may have reported harriers in the state during the breeding season. Nesting has yet to be confirmed for the Arizona Game and Fish Department's breeding-bird atlas survey efforts initiated in 1993 (T. Corman pers. comm.), and there are no harrier nesting records in the department's database. All Arizona harrier specimens on deposit in museums were collected during migration or wintering periods.

Northern Harriers are fairly common transients and winter visitants in Arizona; however, nesting records are rare (Phillips et al. 1964, Phillips 1968, Monson and Phillips 1981, Snyder 1998). The majority of the confirmed or suspected nestings we report correspond with the distribution map generated from breeding-bird survey results (Sauer et al. 1997). These include the northeast part of the state in the Little Colorado River valley of Navajo and Apache counties, southwest in the lower Colorado River valley of La Paz County, and in the extreme southeast in Cochise County. Rosenberg and Terrill (1986) listed the harrier as a possible nesting species for Apache County but made no specific references. Rosenberg et al. (1991) reported only two individuals in the breeding season along the lower Colorado River, near Topock, Mohave County, and near Blythe, Riverside County, California. Snyder (1998) suggested that harriers may nest "regularly but rarely" in northern and southeastern Arizona, but confirmation is difficult because of their ground-nesting habits. Although individual harriers have been observed during the breeding season, we have located only the following records of actual nesting.

The first reported Northern Harrier nest in Arizona (Bendire 1892) was near Laguna, 9 miles north of Tucson (Figure 1, locality 1), and contained two newly

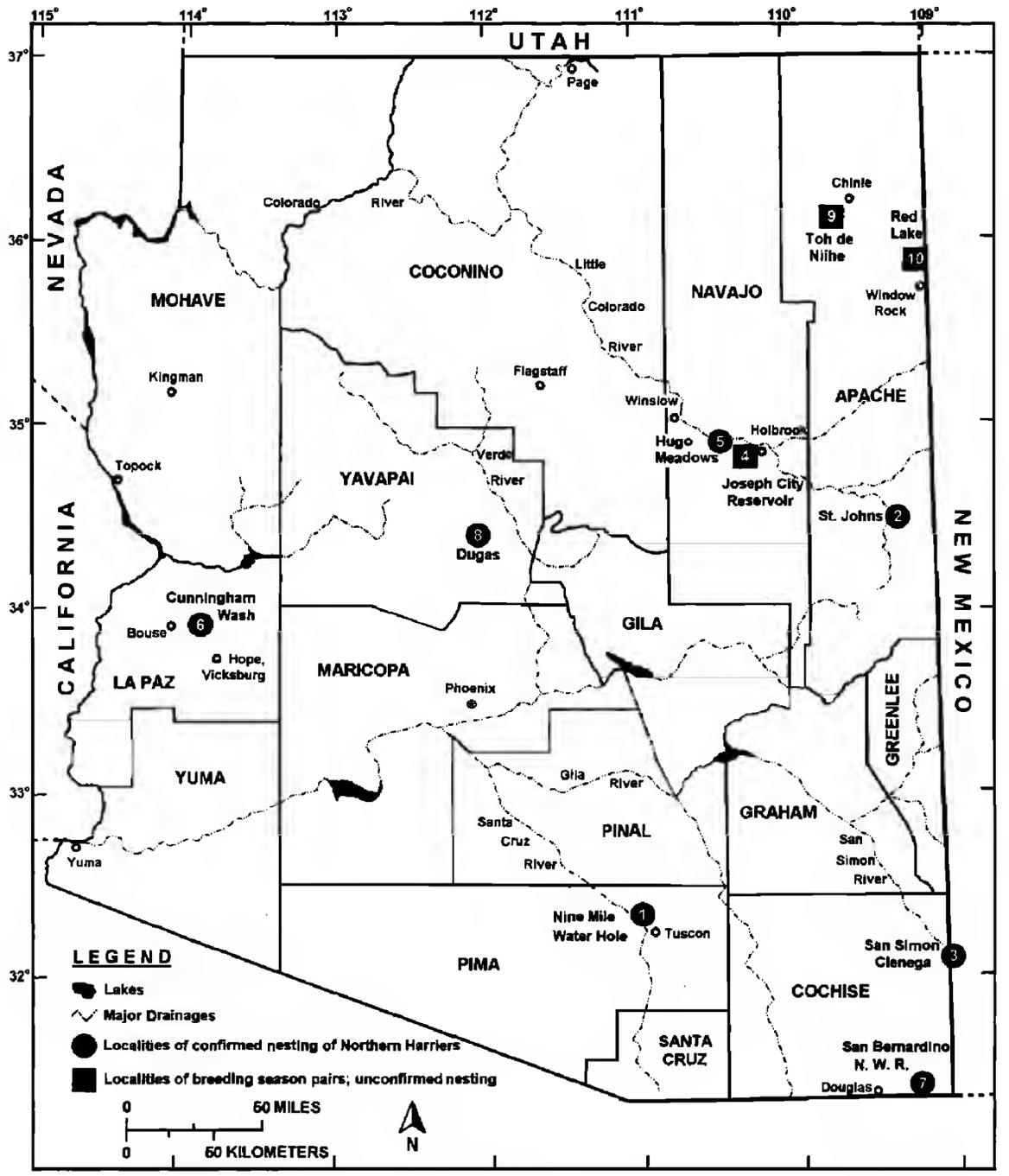

Figure 1. Localities of confirmed (circles) and suspected (squares) nesting Northern Harriers in and near Arizona, 1872–2000.

hatched young and a hatching egg. The "Laguna" near Tucson (not to be confused with Laguna near Yuma) was an old sink along the Santa Cruz River (Phillips et al. 1964) and is probably the same as the historic "Nine Mile Water Hole" near the confluence of Rillito Creek (J. Betancourt and J. Fonseca pers. comm.). Bendire (1892) also reported on other observations of harriers breeding in Arizona, including an account by J. Swinburne that the usual number of eggs in Arizona was two or three. Lacking any specific location, we map Swinburne's record(s) at St. John's (Figure 1, locality 2), given that he lived there and there is suitable habitat nearby along the Little Colorado River.

No other confirmed or suspected breeding Northern Harriers were described from Arizona until the latter half of the 20th century, although Ligon (1961) found two

nests in New Mexico less than 2 km east of the Arizona border at San Simon Cienaga along the San Simon River in Hidalgo County on 6 June 1935 (Figure 1, locality 3). Nearly 30 years later, Phillips (1968) said that a "possibly" nesting harrier was seen in northeastern Arizona at the Joseph City reservoir (= Cholla Lake?), Little Colorado River valley, Navajo County (Figure 1, locality 4). While he gave no date for this record it was possibly some time between the publication of Phillips et al. (1964) and 1968. However, Monson and Phillips (1981) made no mention of this observation, and Monson (pers. comm.) has no knowledge of it.

The next report, also in Navajo County, came nearly a decade later when Witzeman et al. (1977) reported R. L. Todd's having seen a male and female apparently throughout the summer in apparently suitable breeding habitat near Chevelon Creek, east of Winslow. Monson and Phillips (1981) reported this sighting as southeast of Winslow. Monson (pers. comm.) provided specifics from a letter to him by Todd on 7 October 1977: "At Arizona Game and Fish Department's Chevelon Wildlife Area, we flushed a female harrier from the proximity of a male Greenwing Teal (*Anas crecca*) carcass (which we didn't discover until the next day) on June 27, 1977. Then on the following morning, approximately a mile to the east over Hugo Meadows [Figure 1, locality 5], a male harrier flew over and coursed about at (what seemed to me) rather high altitude (for a harrier) for a minute or two. Both sexes were not seen on the same day or at the same exact site. This was the extent of our observations. Wildlife Manager Ken Clay (stationed at Winslow) later told us that seemingly paired Marsh Hawks could be found 'all summer' at most of the wetter meadows along the Little Colorado River in that region."

Millsap (1981) located a nest with three eggs on Cunningham Wash (Figure 1, locality 6) northwest of Hope (Hope is 3 and 35 km southeast of Vicksburg and Bouse, respectively). Some confusion as to the precise location has persisted (Monson and Phillips 1981, Rosenberg and Witzeman 1998). Millsap described the nest site as follows: "Eggs were deposited on a mat of red brome (*Bromus rubens*) near the edge of a large stand (2 ha) of big galleta (*Hilaria rigida*) and Johnson grass (*Sorghum halapense*) surrounded by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*)." He also noted that the nest site was near a communal winter roost site used by Northern Harriers along Cunningham Wash. Rosenberg et al. (1980) went on to say, "Ironically, this nest was bulldozed, before any young fledged, by Central Arizona Project workers attempting to create a lake as mitigation for loss of wildlife habitat!" Also in 1981, on 12 June, R. L. Todd encountered a male Northern Harrier during the breeding season near St. John's in Apache County—Swinburne's location (Rosenberg et al. 1981).

Witzeman and Stejskal (1985) reported A. Moorehouse's account of a failed nesting attempt by Northern Harriers at San Bernardino Ranch from 25 May to 27 June 1985. The ranch is located along the Mexican border on San Bernardino National Wildlife Refuge east of Douglas in Cochise County (Figure 1, locality 7). Moorehouse (pers. comm.) described the habitat as "a seasonally wet swale (then dry) overgrown with annual and perennial herbaceous plants including grasses intermixed with scrubby woody vegetation." Two years later, on 18 June 1987, a male harrier was seen in the same area (Witzeman and Stejskal 1987). Also during 1985, a pair spent the summer at Moaning Lake (also known as Toh De Niihe) in the Navajo Nation, west of Chinle near Cottonwood Wash, Apache County (Jacobs 1986). We consider this a probable breeding record because the pair was present throughout the breeding season, even though nesting was not confirmed (Figure 1, locality 9). Several older nestlings were brought to the Arizona Game and Fish Department's Adobe Mountain Wildlife Center during the mid–1980s (no specific date available; Snyder 1998, R. Glinski pers. comm.). Apparently their nest, in an agricultural field near Dugas, Yavapai County (Figure 1, locality 8), was destroyed during a crop harvest.

On 24 March 1998, Mikesic twice flushed a female harrier from dense vegetation

in Hugo Meadows (34° 56′ 22″ N, 110° 30′ 01″ W, elevation 1498 m), near the confluence of the Little Colorado River and Chevelon Creek, 17.5 km southeast of Winslow, Navajo County—the same area where Todd observed harriers during the breeding season in 1977 (Figure 1, locality 5). This 190-ha alkaline meadow is vegetated primarily with saltgrass (*Distichlis spicata*), iodine bush (*Allenrolfea occidentalis*), and the nonnative camel thorn (*Alhagi maurorum* = *A. camelorum*). A strand of spring-fed and perennially wet marsh, primarily of dense bulrush, 20 to 40 m wide, and over 200 m long, winds through the meadow. The second time the female flushed, she flew north about 200 m and was joined by an adult male, which promptly dropped prey to her. She fed on the ground, then returned within 5 minutes to the same area of the marsh from which she had arisen. Observations were suspended to preclude disturbing the potential nesting site and risking nest abandonment.

Upon returning to the area at 14:00 on 5 May 1998, Mikesic observed the female harrier land in the same bulrush stand. Approaching the strand, he flushed the incubating female from a nest containing five eggs. The nest was 61 cm in diameter and composed entirely of woven bulrush. It was exposed from above but set in the surrounding vegetation so that it was undetectable from a distance >3 m. Photographs were quickly taken, and the female returned to the nest within 10 minutes. No attempt was made to determine the fate of the nesting attempt. Photographs of this nest and surrounding habitat were deposited in the archives of the Navajo Natural Heritage Program, Window Rock, Arizona, and at University of Arizona, Tucson.

The meadow and bulrush strand at this site provides suitable nesting habitat for harriers. Although Northern Harriers had been previously observed foraging at Hugo Meadows on numerous occasions (mostly September through March) and suspected of nesting, breeding had not been confirmed. This 1998 nesting confirmation gives credence to the suspected nesting reported for the area by Todd in 1977.

Mikesic investigated a pair of harriers on 21 June 2000 at Red Lake (Figure 1, locality 10) in the Navajo Nation (on the Arizona–New Mexico state line, 25 km north of Window Rock). The female landed in, and remained for at least 30 minutes within, a 10-ha stand of bulrush (*Scirpus americanus*) at the lake's north end; however, a nest was not located. On 9 June 2000, he located a harrier nest with four eggs in San Juan County, New Mexico, 93 km northeast of Red Lake; this nest was on bare ground within a fallow agricultural field vegetated solely with Russian thistle (*Salsola iberica*).

Further investigation in Arizona may show nesting by harriers to be more common than the current records reveal. Rosenberg et al. (1980) suggested that "late spring harriers should be watched more closely, as they may occasionally breed." Also interesting is Millsap's (1981) finding his nest close to a communal wintering site, a possible guide to nesting harriers. The winter of 1979–1980 was wetter than average and undoubtedly produced an abundant growth in the grasses of the area and perhaps prey. This along with the communal roost may have stimulated nesting in such an arid area.

Nesting by Northern Harriers in Arizona may be opportunistic. Craighead and Craighead (1969) mentioned that migration enables raptors to adjust their numbers to those of their prey. They demonstrated that, in winter, the great mobility of raptors allows them to concentrate from distant areas to take advantage of dense prey populations, although the birds' breeding densities do not vary from year to year. Newton (1979) found that during the breeding season raptors settle in an area partly on the basis of sufficient food supply, partly on the basis of other raptors already there. We suspect that vegetation densities, and small-rodent populations, were higher than normal in 1998 because of above-average precipitation induced by El Niño. Thus, we suspect that nesting by harriers in Arizona may result from their remaining to take advantage of elevated prey densities encountered during winter or spring migration.

The harrier was probably more common and widespread as a breeding species in

Arizona in the past. Much of the wetland formerly available has been lost, degraded, or fragmented through various human activities. With some exceptions, the marshes and backwater lakes historically associated with the Salt, Verde, Gila, San Pedro, Santa Cruz, San Simon, Colorado rivers have disappeared (Minckley and Brown 1982, Brown 1985). The 1872 site described by Bendire (1892) no longer exists. Wetlands in northern Arizona between Joseph City and Winslow, including the Hugo Meadows area, are diminishing (Brown 1985). On the other hand, artificial wetlands like farm and stock ponds, sewage-treatment ponds and recharge basins, cooling ponds at power plants, and irrigated fields may provide new habitat for nesting harriers. The lower Colorado River between Topock and Yuma is another area with potential to support nesting harriers, with the creation of lakes and marshes in the area's national wildlife refuges. Although there have been no reports of harrier nests in this region, nesting efforts could go undetected because of the difficult access of some of these sites and the difficulty of locating nests.

Richard L. Glinski, Brian A. Millsap, Gale Monson, Arnold Moorehouse, and Helen A. Snyder shared their knowledge of Northern Harriers in Arizona. The curators and collection managers of the California Academy of Sciences, U.S. National Museum, Western Foundation of Vertebrate Zoology, and other museums assisted with specimen information from Arizona. Julio L. Betancourt (U.S. Geological Survey, Tucson) and Julia E. Fonseca (Pima County Flood Control District, Tucson) contributed background information on the "Nine Mile Water Hole." Eddie Perry alerted Mikesic to the pair of harriers at Red Lake in June 2000. The manuscript benefited from the comments of Dale W. Stahlecker. We are grateful to all of the above individuals and organizations for their contributions to this report.

LITERATURE CITED

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. Am. Ornithol. Union, Washington, D.C.

Bendire, C. 1892. Life histories of North American birds with special reference to their breeding habits and eggs. U.S. Natl. Mus. Spec. Bull. 1:1–446.

Brown, D. E. 1985. Arizona Wetlands and Waterfowl. Univ. Ariz. Press, Tucson.

Craighead, J. J., and Craighead, F. C., Jr. 1969. Hawks, Owls, and Wildlife. Dover, New York.

Jacobs, B. 1986. Birding on the Navajo and Hopi Reservations. Jacobs Publ. Co., Sycamore, MO.

Ligon, J. S. 1961. New Mexico Birds and Where to Find Them. Univ. N. M. Press, Albuquerque.

MacWhirter, R. B., and Bildstein, K. L. 1996. Northern Harrier (*Circus cyaneus*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 210. Acad. Nat. Sci., Philadelphia.

Millsap, B. 1981. Distributional status of Falconiformes in westcentral Arizona...with notes on ecology, reproductive success, and management. U.S. Bureau of Land Mgmt. Tech. Note 355.

Minckley, W. L., and Brown, D. E. 1982. Wetlands, in Biotic communities of the American Southwest–United States and Mexico. Desert Plants 4:223–287.

Monson, G., and Phillips, A. R. 1981. Annotated Checklist of the Birds of Arizona. Univ. Ariz. Press, Tucson.

Newton, I. 1979. Population Ecology of Raptors. T. & A. D. Poyser, London.

Phillips, A. R. 1968. The instability of the distribution of land birds in the Southwest,

in Collected papers in honor of Lyndon Lane Hargrave (A. H. Schroeder, ed.). Papers Archaeol. Soc. N. M. 1:129–162.

Phillips, A., Marshall, J., and Monson, G. 1964. Birds of Arizona. Univ. Ariz. Press, Tucson.

Rosenberg, G. H., and Terrill, S. B. 1986. The avifauna of Apache County, Arizona. W. Birds 17:171–187.

Rosenberg, G. H., and Witzeman, J. L. 1998. Arizona Bird Committee report, 1974–1996: Part 1 (Nonpasserines). W. Birds 29:199–224.

Rosenberg, K. V., Hubbard, J. P., and Rosenberg, G. H. (compilers). 1980. Southwest Region. Am. Birds 34:803–806.

Rosenberg, K. V., Hubbard, J. P., and Rosenberg, G. H. (compilers). 1981. Southwest Region. Am. Birds 35:966–969.

Rosenberg, K. V., Ohmart, R. D., Hunter, W. C., and B. W., Anderson. 1991. Birds of the Lower Colorado River Valley. Univ. Ariz. Press, Tucson.

Sauer, J. R., Hines, J. E., Gough, G., Thomas, I., and Peterjohn, B. G. 1997. The North American breeding bird survey results and analysis, version 96.4. Patuxent Wildl. Res. Ctr., Laurel, MD.

Snyder, H. A. 1998. Northern Harrier, in The Raptors of Arizona (R. L. Glinski, ed.), pp. 55–57. Univ. of Ariz. Press, Tucson.

Speich, S., and Parker III, T. A. 1973. Arizona bird records, 1972. W. Birds 4:53–57.

Speich, S. M., and Witzeman, J. L. 1975. Arizona bird records, 1973, with additional notes. W. Birds 6:145–155.

Witzeman, J., Hubbard, J. P., and Kaufman, K. (compilers). 1977. Southwest Region. Am. Birds 31:1171–1176.

Witzeman, J., and Stejskal, D. 1985. Southwest Region. Am. Birds 39:945–949.

Witzeman, J., and Stejskal, D. 1987. Southwest Region, Arizona and Sonora. Am. Birds 41:1470–1472.

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INCOMPLETE FIRST PREBASIC MOLT IN THE WRENTIT

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Flight-feather molt in most passerines begins with the innermost primary and proceeds distally, while the replacement of secondaries begins at the outermost feather and proceeds proximally (Ginn and Melville 1983, Pyle 1997a, 1998). During their first year, most passerines do not replace any flight feathers (i.e., the molt is partial), while a few replace some (i.e., the molt is incomplete) or all remiges (i.e., the molt is complete) (Jenni and Winkler 1994, Pyle 1997a).

In a few species, incomplete first-year molts follow different patterns, which involve a sequence of replacement similar to that found during complete molts but begin at different points along the wing (Jenni and Winkler 1994). Such incomplete remex molt, termed "eccentric," has been documented for some North American passerines, including the Loggerhead Shrike (*Lanius ludovicianus*), Yellow-breasted Chat (*Icteria virens*), and certain tyrant flycatchers (Miller 1928, Phillips 1974, Thompson and Leu 1994, Pyle 1998).

Between November 1999 and March 2000 Point Reyes Bird Observatory (PRBO) biologists documented several examples of incomplete molt of flight feathers on first-year Wrentits (*Chamaea fasciata*) captured at three mist-netting sites operated as part of PRBO's landbird-monitoring program. The study sites were located approximately 28 km northwest of San Francisco, within and just outside of the Point Reyes National Seashore, Marin County, California. These are the first recorded observations of incomplete first prebasic molt in the Wrentit, which was previously considered to have a complete first prebasic molt (Pyle 1997a, b).

We examined 101 study skins of Wrentits at the California Academy of Sciences (CAS) to determine whether or not the mist-netted birds were anomalous. To ensure that molt had been completed and feather wear was minimal, we examined only specimens collected between September and February. We examined both wings and noted the location of retained feathers. The age of the bird, if known, was recorded from the tag data. Because of the difficulty of viewing the closed wings of study skins, both of us examined the same skins independently to ensure accurate recording of presence or absence of retained feathers.

On the 23 mist-netted Wrentits, we examined the primaries and secondaries of each wing carefully and noted the location and symmetry of retained feathers between wings. We determined the age of each live bird either by the degree of skull pneumatization (Pyle 1997a) or, if the individual had been banded previously, we referenced PRBO capture data. The difference in flight-feather age was obvious on live birds in the hand, retained feathers being noticeably worn and light brown, newly replaced feathers fresh and dark brown. Of the 16 first-year (hatched in 1999) Wrentits examined, nine (56 %) had retained some juvenal flight feathers while the other 44% had undergone a complete first prebasic molt. All of the older birds (hatched prior to 1999) had undergone a complete molt as expected, with all flight feathers having been replaced (n = 7).

Of the 101 museum specimens examined, 11 showed incomplete wing molt. The collectors identified only three of the 101 study specimens to age and none of the 11 with incomplete molt was aged. The locations of specimens with incomplete molt included Marin, San Mateo, Alameda, Placer, and Los Angeles counties.

On both live birds and study skins the patterns of replacement varied. The most common pattern (10 of 20 birds) was the bird's replacing all primaries and retaining only a few secondaries, usually secondaries 1–3. Another pattern seen in three of 20

birds included retention of primaries 1–2 and secondaries 1–4. We observed a few examples of asymmetrical replacement, with some feathers retained on one wing and replaced on the other. This was not unexpected, as eccentric sequences of molt were asymmetrical in 60% of cases reported by Jenni and Winkler (1994).

In the life history of a bird, molt is a fundamental high-energy expenditure not fully understood by biologists. There are numerous theories that may explain eccentric molt observed in some birds. One possible explanation may be poor environmental conditions. If weather were bad and/or food scarce, an incomplete molt would enable the bird to conserve energy by replacing only the most critical feathers. In species whose first prebasic molt includes some to all flight feathers, hatching date and its effect on the timing of molt may influence the extent of feathers renewed. Birds hatched late in the season experience more of a time constraint on molt and thus may molt more quickly after fledging, finish molting in a shorter time period, and replace fewer feathers than those hatched earlier in the season (Jenni and Winkler 1994). Also, in the Wrentit, which spends its entire life in dense scrub or chaparral, enduring extensive feather wear through contact with harsh vegetation, incomplete molt may be a strategy to molt the minimal number of feathers necessary to protect and preserve the retained feathers. Incomplete remex molt is also known in such diverse North American species as the Verdin (*Auriparus flaviceps*), White-eyed Vireo (*Vireo griseus*), Yellow-breasted Chat, Field Sparrow (*Spizella pusilla*), and several species of wrens, thrashers, sparrows, and orioles (George 1973, Willoughby 1991, Thompson and Leu 1994, Pyle 1997b, 1998).

Retained feathers are a helpful criterion used to age passerines in the hand. Most adult North American passerines have a complete prebasic molt (Pyle 1997a), so incomplete molt indicates a first-year bird, at least until the first prealternate molt or second prebasic molt (Mulvihill 1993, Jenni and Winkler 1994, Pyle 1997b). The occurrence of incomplete molt in the Wrentit makes it possible to age some first-year birds after skull pneumatization is complete. We caution that over time retained juvenal feathers may be more difficult to discern as renewed feathers age and become more worn and faded. We promote further study of incomplete molt and encourage museum curators to consider spread-wing specimens to facilitate future studies.

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LITERATURE CITED

George, W. G. 1973. Molt of juvenile White-eyed Vireos. Wilson Bull. 85:327–300.

Ginn, H. B., and Melville, D. S. 1983. Moult in Birds. Guide 19. Br. Trust Ornithol., Tring, England.

Jenni, L., and Winkler, R. 1994. Moult and Ageing of European Passerines. Academic Press, London.

Miller, A. H. 1928. The molts of the Loggerhead Shrike *Lanius ludovicianus*. Univ. Calif. Publ. Zool. 30:393–417.

Mulvihill, R. S. 1993. Using wing molt to age passerines. N. Am. Bird Bander 18:1–10.

Phillips, A. R. 1974. The first prebasic molt of the Yellow-breasted Chat. Wilson Bull. 86:12–15.

Pyle, P. 1997a. Identification Guide to North American Passerines. Slate Creek Press, Bolinas, CA.

Pyle, P. 1997b. Molt limits in North American passerines. N. Am. Bird Bander 22:49–90.

Pyle, P. 1998. Eccentric first-year molt patterns in certain tyrannid flycatchers. W. Birds 29:29–35.

Thompson, C. W., and Leu, M. 1994. Determining homology of molts and plumages to address evolutionary questions: A rejoinder regarding emberizid finches. Condor 96: 769–782.

Willoughby, E. J. 1991. Molt of the genus *Spizella* (Passeriformes, Emberizidae) in relation to ecological factors affecting plumage wear. Proc. W. Found. Vert. Zool. 4:247–286.

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STATUS OF THE YELLOW-BILLED CUCKOO IN IDAHO

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The Yellow-billed Cuckoo (*Coccyzus americanus*) is a rare bird in the western United States, with an estimated population of 475 to 675 pairs by the late 1980s (Laymon and Halterman 1987). Its historic range has contracted dramatically, particularly in the Pacific Northwest, where it disappeared as a breeding bird from British Columbia, Washington, and Oregon between the 1920s and 1950s (Roberson 1980, Gaines and Laymon 1984, Marshall et al. 1996). It is under review for listing as a threatened or endangered species by the U.S. Fish and Wildlife Service, and it is listed as endangered, threatened, or a species of concern by state wildlife agencies in California, Oregon, and Arizona (Hughes 1999).

In Idaho, the Yellow-billed Cuckoo has been a rare breeder (Larrison et al. 1967, Burleigh 1972, Taylor and Trost 1987, Stephens and Sturts 1991), and currently the species is considered critically imperiled (Groves et al. 1997). In a recent North American summary of its status and distribution (Hughes 1999), Idaho was represented by question marks and inaccurate map distributions, with no specific information about its status. A priority for ensuring its survival is determining its numbers and locations (Laymon and Halterman 1987, Hughes 1999). Here I summarize known records of this species in Idaho and assess its current status in the state.

In northern and central Idaho there are only four records of the Yellow-billed Cuckoo, scattered over the last century. These include one collected at Coeur d'Alene, Kootenai Co. (Merrill 1897), sightings at Whitebird Hill, Idaho Co. (Larrison et al. 1967), and Kendrick, Latah Co. (Weber and Larrison 1977), and a record of a migrant from somewhere in central Idaho (Stephens and Sturts 1991).

In southwestern Idaho the Yellow-billed Cuckoo has historically been considered a "rare summer visitor and breeder, perhaps erratic, in the western part of the Snake River Valley" (Larrison et al. 1967). Sites of records in the last quarter century include Battle Creek and Crane Creek Reservoir, Owyhee Co. (Svingen 1996, T. Rich pers. comm.), an island in the Snake River, Fort Boise Wildlife Management Area (W.M.A.), and Lake Lowell, Canyon Co. (Rogers 1978, Taylor and Trost 1987, J. Gatchette pers. comm., G. Kaltenecker pers. comm.), Prairie, Elmore Co. (Rogers 1979), Swan Falls Dam, Ada Co. (Rogers 1985), Hayspur Fish Hatchery, Blaine Co. (Svingen 1997), and the Twin Falls area, Twin Falls Co. (Rogers 1984). Yellow-billed Cuckoos have not been recorded more than once at any of these locations, except for the single records from the 1970s, 1980s, and 1990s at Lake Lowell.

Yellow-billed Cuckoos have occurred most frequently and consistently in cottonwood (*Populus* sp.) forests with thick understory along the Snake River in southeastern Idaho (Groves et al. 1997). At Rupert, Minidoka Co., occupied nests were found early in the century (Davis 1935), and there were numerous summer records in the 1980s (Rogers 1984, 1985, 1988). Cuckoos have been found in most years since the early 1980s around American Falls Reservoir, particularly on the stretch of Snake River flowing into the reservoir (Taylor and Trost 1987, Taylor et al. 1997, 1999, C. H. Trost pers. comm., pers. obs.). On the main Snake River above Blackfoot, individual records have come from Shelly (Taylor et al. 1997) and Firth (Rogers 1986), Bingham Co. At Cartier W.M.A., Madison Co., up to a dozen pairs nested in the early 1980s (Taylor and Trost 1987), and the species was reported at least until 1990 (Rogers 1991). Saab (1999) found a few pairs and nests in the Twin Bridges area near Ririe, Jefferson Co., but none upstream to Palisades Dam despite extensive surveying in the 1990s (V. Saab pers. comm.). Away from the Snake River there have been recent records of individuals from Mud Lake and Camas National Wildlife Refuge, Jefferson Co. (Svingen 1996, 1997).

The Yellow-billed Cuckoo appears to be hanging on precariously in Idaho, primarily along the Snake River in the southeastern part of the state. There are probably not more than a few dozen pairs breeding annually in the state, and quite possibly fewer than ten pairs. Because of the paucity of early observers (Burleigh 1972, Taylor and Trost 1987) and the difficulty of observing the species, it is difficult to determine the historical abundance of cuckoos. However, it is almost certain that the species has declined from historical levels, as it has in other western states (Laymon and Halterman 1987, Marshall et al. 1996, Hughes 1999). The Yellow-billed Cuckoo should be considered one of the most endangered bird species in Idaho. It could easily become extirpated from the state in the near future.

Most Idaho Yellow-billed Cuckoo records have come from large stands of mature cottonwoods with a well-developed understory (Groves et al. 1997, Saab 1999, pers obs.), the preferred habitat in California (Laymon and Halterman 1987) and Oregon (Marshall et al. 1996). Little ecological research has been conducted on the riparian vegetation of the Snake and other rivers in Idaho, but much of this vegetation has undergone modification and deterioration (Dixon and Johnson 1999). On an 83-mile stretch of the middle Snake River, riparian woodland has increased since the 1930s but two thirds of these woodlands are composed of exotic tamarisk (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*), with willows (*Salix* spp.) the dominate native, and cottonwoods uncommon (Dixon and Johnson 1999). Restoration of large areas of riparian cottonwood with a thick understory, particularly willow (Marshall et al. 1996), would probably benefit the Yellow-billed Cuckoo in Idaho greatly.

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LITERATURE CITED

Burleigh, T. D. 1972. Birds of Idaho. Caxton, Caldwell, ID.

Davis, W. B. 1935. An analysis of the bird population in the vicinity of Rupert, Idaho. Condor 37:233–238.

Dixon, M. D., and Johnson, W. C. 1999. Riparian vegetation along the middle Snake River, Idaho: Zonation, geographic trends, and historical changes. Great Basin Nat. 59:18–34.

Gaines, D., and Laymon, S. A. 1984. Decline, status, and preservation of the Yellow-billed Cuckoo in California. W. Birds 15:49–80.

Groves, C. R., Butterfield, B., Lippincott, A., Csuti, B., and Scott, J. M. 1997. Atlas of Idaho's Wildlife. Ida. Dept. Fish & Game, Nongame and Endangered Wildlife Program, Boise.

Hughes, J. M. 1999. Yellow-billed Cuckoo, in The Birds of North America (A. Poole and F. Gill, eds.), no. 418. Birds N. Am., Philadelphia.

Larrison, E. J., Tucker, J. L., and Jollie, M. T. 1967. Guide to Idaho Birds. J. Idaho Acad. Sci. 5:1–220.

Laymon, S. A., and Halterman, M. D. 1987. Can the western subspecies of the Yellow-billed Cuckoo be saved from extinction? W. Birds 18:19–25.

Marshall, D.B., Chilcote, M. W., and Weeks, H. 1996. Species at risk: Sensitive, threatened and endangered vertebrates of Oregon, 2nd ed. Ore. Dept. Fish & Wildlife, Portland.

Merrill, J.C. 1897. Notes of the birds of Fort Sherman, Idaho. Auk 14:347–357.

Roberson, D. 1980. Rare Birds of the West Coast. Woodcock Publ., Pacific Grove, CA.

Rogers, T. H. 1978. Northern Rocky Mountain–Intermountain Region. Am. Birds. 32:1033–1036.

Rogers, T. H. 1979. Northern Rocky Mountain–Intermountain Region. Am. Birds. 33:881–883.

Rogers, T. H. 1984. Northern Rocky Mountain–Intermountain Region. Am. Birds. 38:1042–1044.

Rogers, T. H. 1985. Northern Rocky Mountain–Intermountain Region. Am. Birds. 39:938–941.

Rogers, T. H. 1986. Northern Rocky Mountain–Intermountain Region. Am. Birds. 40:499–502.

Rogers, T. H. 1988. Northern Rocky Mountain–Intermountain Region. Am. Birds. 42:1318–1320.

Rogers, T. H. 1991. Northern Rocky Mountain–Intermountain Region. Am. Birds. 45:1139–1141.

Saab, V. 1999. Importance of spatial scale to habitat use by breeding birds in riparian forests: A hierarchical analysis. Ecol. Appl. 9:135–151.

Stephens, D. A., and Sturts, S. H. 1991. Idaho Bird Distribution. Ida. Mus. Nat. Hist. Publ. 11:1–76.

Svingen, D. 1996. Idaho–Western Montana Region. Natl. Audubon Soc. Field Notes 50:973–975.

Svingen, D. 1997. Idaho–Western Montana Region. Natl. Audubon Soc. Field Notes 51:1024–1026.

Taylor, D. M., and Trost, C. H. 1987. The status of rare birds in Idaho. Murrelet 68:69–93.

Taylor, D. M., Jones, V. E., Trost, C. H., and Fichter, E. 1997. Bird specimens in the Idaho Museum of Natural History. Tebiwa 26:255–287.

Taylor, D. M., Burrup, D., Trost, C. H., and Porth, A. 1999. Birds of the American Falls Reservoir Area, Snake River, Idaho. J. Ida. Acad. Sci. 35:1–37.

Weber, J. W., and Larrison, E. J. 1977. Birds of southeastern Washington. Univ. Ida. Press, Moscow, ID.

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POWER POLE CASUALTIES AMONG RAPTORS AND RAVENS IN NORTHWESTERN CHIHUAHUA, MEXICO

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On 11 and 12 February 2000, we searched for dead raptors and ravens beneath 1612 consecutive power poles near the village of San Pedro (30° 51'N, 108° 23'W) in northwestern Chihuahua, Mexico. Two of us (Cartron and Manzano-Fisher) resurveyed 214 consecutive poles along two power lines on 23 and 24 March 2000. The area we surveyed represents one of the few well-preserved grasslands left in Mexico (Miller et al. 1994). It supports the largest complex of Black-tailed Prairie-dog (*Cynomys ludovicianus*) towns remaining in North America (Ceballos et al. 1993), along with relatively high numbers of wintering and nesting raptors (Manzano-Fisher et al. 1999). Power lines are also present in the area, some of them built at the edge of, or within, the boundaries of prairie-dog colonies.

We conducted our searches on foot, except where the road was immediately adjacent to a power line. In such a case, we drove the distance between poles and stopped to inspect the ground beneath each pole. Because the vegetation along power lines was typically very short, searches by car also allowed us to inspect the ground visually between poles. In March, the two power lines we surveyed again were those with the largest number of raptor remains found in February.

All of the power poles surveyed were built in the three-phase configuration known to be most dangerous to raptors (Olendorff et al. 1981, APLIC 1996). Most of them were single concrete poles with a steel cross arm. The total number of power poles inspected in February and March represented a cumulative distance of 163 and 24 km of power lines, respectively. Surrounding vegetation types typically ranged from pure grassland and grassland associated with *Ephedra, Yucca,* or *Opuntia* to shrubland of mesquite (*Prosopis* sp.). Some of the areas surveyed were also characterized by pastures, agricultural fields, or bare ground.

In February, we discovered the remains of at least 27 raptors and 15 ravens at the base of 39 power poles. We found an additional Golden Eagle (*Aquila chrysaetos*) beneath a power line between two poles. In most cases the remains of dead birds were limited to a large number of feathers or some body parts. However, all dead bodies of Golden Eagles were whole, as where those of a few Ferruginous Hawks (*Buteo regalis*) and Red-tailed Hawks (*Buteo jamaicensis*). No bullet wounds were visible in any of these carcasses. The most frequent raptors were the Ferruginous Hawk (n = 9), Golden Eagle (n = 9), and Red-tailed Hawk (n = 6). Three Prairie Falcons (*Falco mexicanus*) and one American Kestrel (*Falco sparverius*) were also found. Six of the Golden Eagles were adults. At least one dead Ferruginous Hawk was an adult. In addition to these remains, we also found beneath six poles single feathers, one of the Ferruginous Hawk, one of the Red-tailed Hawk, four unidentified, that suggested other possible casualties.

In March, we found at least one dead raven, two Golden Eagles (one adult and one immature), one adult Ferruginous Hawk, one Red-tailed Hawk, and one Turkey Vulture that had not been present in February. The Turkey Vulture (*Cathartes aura*

and Ferruginous Hawk carcasses were found beneath the same power pole. One of the dead Golden Eagles was found between two poles rather than at the base of one. All Golden Eagle carcasses found in February were still present. Of two whole Ferruginous Hawk carcasses found in February, only one remained; we searched for the other but found only scattered feathers. All Golden Eagles and Ferruginous Hawks discovered in February and March were found beneath poles or lines near or within prairie-dog towns.

Electrocution by power lines can be an important cause of mortality among raptors and ravens (Ferrer and Hiraldo 1990, Olendorff et al. 1981, Real et al. 1996, APLIC 1996, Bayle 1999). Electrocution is typically the result of power-pole configuration rather than voltage (Williams and Colson 1989). In the western U.S., it occurs primarily in areas with few natural perches, such as shrublands and grasslands (Boeker and Nickerson 1975, Benson 1982, APLIC 1996). In our study area, the risk of electrocution among raptors is likely compounded by the scarcity of trees, low levels of human disturbance near power lines, and high population densities of Black-tailed Prairie-dogs that attract foraging Golden Eagles and Ferruginous Hawks.

Our data do not allow us to estimate the incidence of electrocutions. In addition to the limited scope of our survey, the total number of deaths by electrocution beneath the 214 poles revisited in March was likely underestimated because of scavenging by Coyotes (*Canis latrans*). However, our study strongly suggests that power poles may be an important cause of mortality among at least Ferruginous Hawks, Golden Eagles, and ravens in the prairie-dog town complex of northwestern Chihuahua. Although most Golden Eagles killed by electrocution are typically immature or subadult (Boeker and Nickerson 1975, Benson 1981), in our survey area they may be chiefly adults. Importantly, our survey also documents the presence of smaller raptors such as the Prairie Falcon among power-pole casualties. From the results of our surveys, we believe that electrocution of raptors and ravens represents a serious local conservation problem that needs to be addressed.

LITERATURE CITED

Avian Powerline Interaction Committee (APLIC). 1996. Suggested practices for raptor protection on powerlines: The state of the art in 1996. Edison Electric Inst./Raptor Found., 701 Pennsylvania Ave. NW, Washington, 20004-2696.

Bayle, P. 1999. Preventing birds of prey problems at transmission lines in western Europe. J. Raptor Res. 33:43–48.

Benson, P.C. 1981. Large-raptor electrocution and power-pole utilization: A study in six western states. Ph.D. dissertation, Brigham Young Univ., Provo, UT.

Benson, P. C. 1982. Prevention of Golden Eagle electrocution. EA-2680 Res. Proj. 1002, Final Rep. Electric Power Res. Inst., 3412 Hillview Ave., Palo Alto, CA 94304.

Boeker, E. L., and P. R. Nickerson. 1975. Raptor electrocutions. Wildlife Soc. Bull. 3:79–81.

Ceballos, G., Mellink, E., and Hanebury, L. R. 1993. Distribution and conservation of prairie dogs *Cynomys mexicanus* and *Cynomys ludovicianus* in Mexico. Biol. Cons. 63:105–112.

Ferrer, M., and Hiraldo, F. 1990. Evaluation of management techniques for the Spanish Imperial Eagle. Wildlife Soc. Bull. 19:436–442.

Manzano-Fisher, P., List, R., and Ceballos, G. 1999. Grassland birds in prairie-dog towns in northwestern Chihuahua, Mexico. Studies Avian Biol. 19:263–271.

Miller, B., Ceballos, G., and Reading, R. 1994. The prairie dog and biotic diversity. Cons. Biol. 8:677–681.

Olendorff, R. R., Miller, A. D., and Lehman, R. N. 1981. Suggested practices for raptor protection on power lines: The state of the art in 1981. Raptor Res. Rep. 4.

Real, J., Manosa, S., Cheylan, G., Bayle, P., Cugnasse, J.-M., Sanchez, J. A., Sanchez, M. A., Carmona, D., Martinez, J. E., Rico, L., Codina, J., Del Amo, R., and Eguia, S. 1996. A preliminary approach to the European Bonelli's Eagle population decrease in Spain and France, in Eagle Studies (B.-U. Meyburg and R. D. Chancellor, eds.), pp. 523–528. World Working Group on Birds of Prey and Owls, Berlin.

Williams, R. D., and Colson, E. W. 1989. Raptor associations with linear rights-of-way, in Proc. W. Raptor Mgmt. Symp., Sci. & Tech. Series (B. G. Pendleton, ed.), no. 12, pp. 173–192. Natl. Wildlife Fed., Washington, D.C.

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GRAY VIREOS WINTERING IN CALIFORNIA ELEPHANT TREES

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The Gray Vireo (*Vireo vicinior*) winters primarily in Sonora and Baja California Sur (e.g., Barlow et al. 1999). There are scattered winter records from the Mexican states of Durango (Leukering and Bradley 1997), Coahuila (Howell and Webb 1995), and San Luis Potosí (Fry et al. 1996). North of the Mexican border the only winter records are from the Big Bend area of Texas (Barlow and Wauer 1971) and southern, primarily southwestern, Arizona, north to the Kofa Mountains (Phillips et al. 1964). There are no published winter records for Upper California.

On 4 May 1999, as part of a field survey for the San Diego County bird atlas, Lori Hargrove visited the canyon of Alma Wash, 6 miles south of Ocotillo Wells and 3 to 5 miles west of Split Mountain Road. She reported to me large numbers, perhaps a few thousand, of the Elephant Tree (*Bursera microphylla*), a concentration far greater than any reported by Dice et al. (1992). The five stands of the Elephant Tree enumerated by Dice et al. in the Anza–Borrego Desert of eastern San Diego County exhaust the tree's known distribution in Upper California. A survey by helicopter on 21 January 2000 confirmed the Alma Wash population as by far the largest in the state (J. C. Dice pers. comm.)

Bursera microphylla is locally common in Baja California and Sonora (Turner et al. 1995). Bates (1992a) found Gray Vireos wintering in Sonora to be closely linked to it, feeding primarily on its fruit and being, with the Ash-throated Flycatcher (*Myiarchus cinerascens*), the primary disperser of its seeds, via regurgitation. He noted that the winter range of the vireo closely matches the distribution of the tree, except in the Anza–Borrego Desert and a few canyons in Arizona. There are no definite previously published winter records for Baja California north of 28° N (Grinnell 1928, Wilbur 1987), but the species occurs in Elephant Trees at least in Guadalupe Canyon at the east base of the Sierra Juárez (8 February 1997, R. Fischer; 12–13 March 2000, J. Morlan and R. Fischer; 5–6 April 2000, R. E. Webster).

Since the largest stand of the Elephant Tree in California had never been visited in winter by ornithologists or birdwatchers, I reasoned that an undiscovered population of wintering Gray Vireos might occur there. Therefore, to test the hypothesis, I organized an expedition on 4 and 5 December 1999. Lori Hargrove made supplementary visits to the bajada below the mouth of the canyon on 27 November and 6 December.

We found a minimum of five Gray Vireos, all in areas of concentrations of Elephant Trees, mixed with Desert Lavender (*Hyptis emoryi*), Catclaw Acacia (*Acacia greggii*), and Creosote Bush (*Larrea tridentata*)—the same habitat in which Gray Vireos winter in Sonora (Bates 1992a). At least two were along Alma Wash on the bajada below the canyon (33° 03′ 11–23″ N, 116° 07′ 53–08′ 09″ W; 33° 03′ 22″ N, 116° 08′ 35″ W), two were inside the canyon (33° 03′ 39–41″ N, 116° 10′ 6–16″ W), one near the upper end known as Starfish Cove (33° 03′ 39–43″ N, 116° 10′ 46–57″ W), and one was 0.7 mile south of Alma Wash in another canyon (33° 02′ 47″ N, 116° 09′ 19″ W) (Figure 1). Alma Wash and Starfish Cove are not named on U. S. Geological Survey topographic maps but are on maps of the Anza–Borrego Desert, e.g., that of Earthwalk Press (1994). The bajada labeled "Elephant Tree Area" on the USGS maps actually has very few Elephant Trees except along the broad rocky wash.

The birds were in small mixed-species flocks with Black-tailed Gnatcatchers (*Polioptila melanura*), Verdins (*Auriparus flaviceps*), Black-throated Sparrows (*Amphispiza bilineata*), and Bewick's Wrens (*Thryomanes bewickii*). Barlow et al. (1999) also reported wintering Gray Vireos in mixed flocks, though this does not

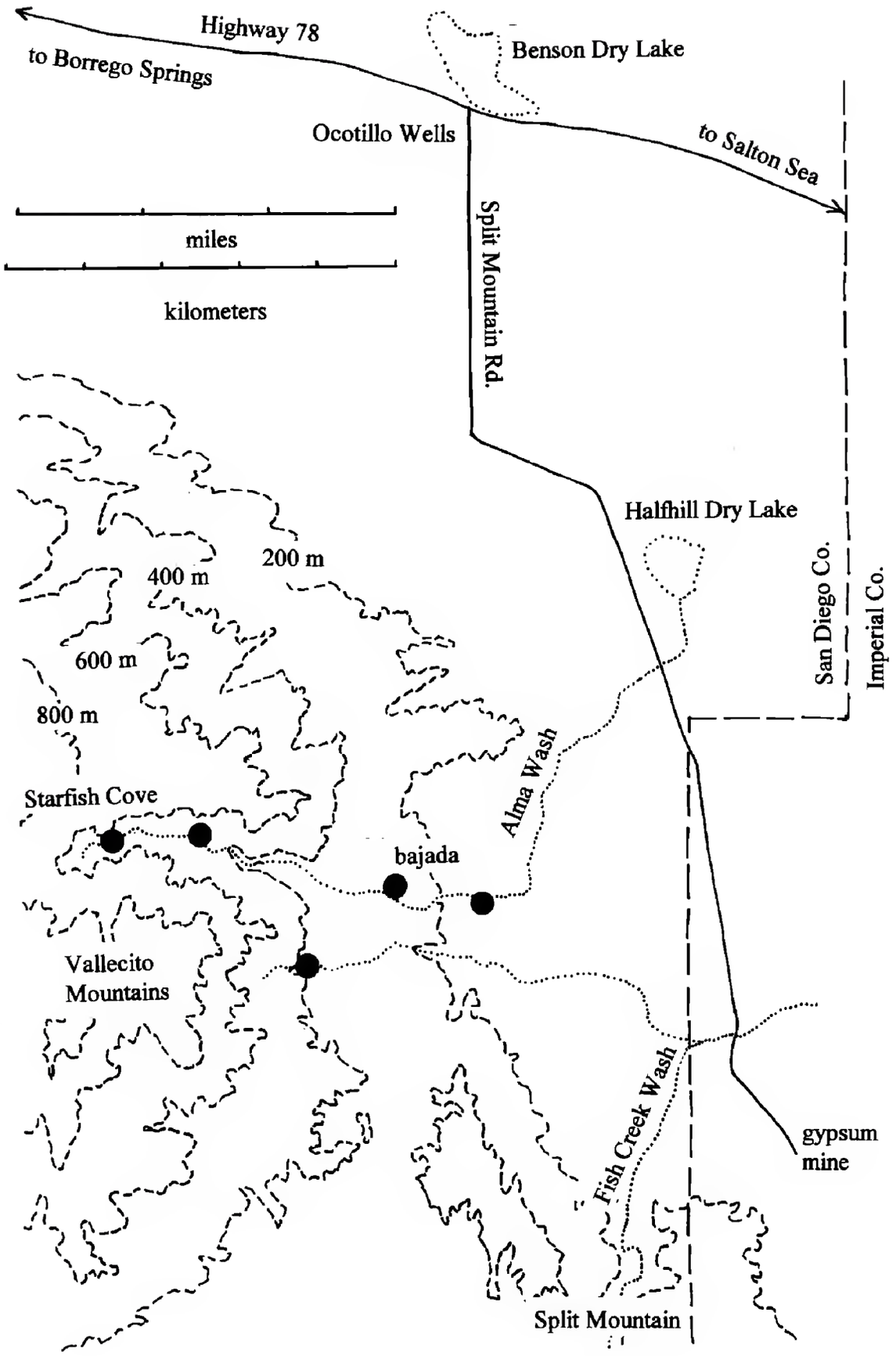

Figure 1. Locations of Gray Vireos sighted in stands of the Elephant Tree south of Ocotillo Wells, Anza–Borrego Desert State Park, December 1999.

preclude winter territoriality as described by Bates (1992b). Though we were unsuccessful in taking any photographs, we saw all the birds extremely well, noting their size slightly smaller than a Black-throated Sparrow, bill short and thick for a vireo, uniformly gray upperparts, whitish underparts, complete narrow white eye ring, lack of white lores, single narrow white wing bar, and narrow white edges on the secondaries. Though we did not observe the vireos feeding, they were all near numbers of female Elephant Trees (the plant is largely dioecious), well festooned with fruit (Figure 2).

We broadcast a taped recording of the Gray Vireo's song from time to time but located all but one of the birds visually, and the exception was singing spontaneously. Another sang in response to the tape after being sighted. One bird gave a scolding call resembling the scold of Hutton's Vireo (*Vireo huttoni*), and two gave the brief high-pitched trill described and illustrated by Barlow et al. (1999), a call unlike those of other vireos occurring in California. Bates (pers. comm.) found this trill to be the most frequent vocalization of Gray Vireos wintering on the coast of Sonora.

The number of Gray Vireos we observed, and their being found readily on a first attempt, imply that the species is a normal winter visitor in the area. There had been no unusual rains that might induce an irregular species to extend its range north into this extremely arid region; indeed, annual rainfall in the Anza–Borrego Desert has been well below normal since the wet El Niño winter of 1997–98. We noted only the last remains of ephemeral vegetation that proliferated after cloudbursts on 11, 12, and 23 July 1999.

Our discovery might be construed as supporting other reports, published and unpublished, of the Gray Vireo in the Anza–Borrego Desert. Nevertheless, only one of these is well supported, a sighting of an apparent migrant at Yaqui Well on 10 April 1988 by D. R. Willick (American Birds 42:482). The species is easily confused with either the Plumbeous (*V. plumbeus*) or Bell's Vireo (*V. bellii*), both known to occur in the

Figure 2. Fruiting Elephant Tree (*Bursera microphylla*) frequented by a Gray Vireo in Alma Wash, Anza–Borrego Desert State Park, 4 December 1999.

Photo by Jack W. Schlotte

the Anza–Borrego Desert in winter (the Plumbeous in planted pines, winter 1998–99, pers. obs.; Bell's in mesquites, 24 January 1984, SDNHM 42925). The Gray Vireo is virtually unknown away from its breeding and wintering ranges as a migrant. The sole record of a migrant from California listed by Grinnell and Miller (1944), of one collected at Mecca, Riverside County, on 26 March 1911 (van Rossem 1911) is in fact in error. Michael A. Patten and I examined the specimen (UCLA 10697) and found it is a Bell's Vireo, as specified on its label, apparently not the original. Since van Rossem (1911) reported collecting only one specimen of any vireo on his trip to the Salton Sea region, this must be the specimen he originally identified as the Gray. I suggest that the Gray Vireo normally makes the commute between its breeding and winter ranges in a single nonstop flight. Undoubtedly much remains to be learned of the Gray Vireo's distribution; for example, the species extends farther north in Nevada, presumably as a breeder, than reported by Johnson (1972)—J. V. Remsen (pers. comm.) noted one at Lida Pass on 29 May 1976, and M. A. Patten (pers. comm.) noted another at Lida on 27 May 1995. The distribution of the Elephant Tree in northern Baja California, local along the east base of the sierras Juárez and San Pedro Mártir, widespread between latitudes 30° and 28° N (Turner et al. 1995), suggests that wintering Gray Vireos may be found at many places there in addition to Guadalupe Canyon.

Our observations in the Anza–Borrego Desert thus support Bates' hypothesis of a mutual dependence of the Gray Vireo and Elephant Tree. The Gray Vireo has long been recognized as a seriously declining species in California, owing to brood parasitism by the Brown-headed Cowbird (*Molothrus ater*) (e.g., Remsen 1978). The Elephant Tree itself is considered endangered in California by the California Native Plant Society (Skinner and Pavlik 1994). Quite possibly, the Gray Vireos wintering in California, at the northwestern end of the winter range, breed in California, the western end of the breeding range. The viability of the Elephant Tree in California could be affected by an interaction between vireos and cowbirds that takes place far from the trees themselves.

I thank John Bates for providing a taped recording of the Gray Vireo he made in Sonora. Thanks to the other participants in the expedition to search for the vireos, Maryanne Bache, Lori Hargrove, Mark David Hoefer, Ginger Rebstock, Robert Sanger, Jack W. Schlotte, David Seals, and James O. Zimmer. They enabled us to split into several groups and cover more areas, some repeatedly, than would have been possible otherwise. Thanks to CalTrans and Pam Beare for the funding toward the San Diego County bird atlas that provided for Hargrove's initial visit. Thanks to Fritz Hertel, University of California, Los Angeles, for the loan of van Rossem's specimen. Thanks to Robbie Fischer, Joseph Morlan, and Richard E. Webster for their observations from Baja California. Thanks to John Bates and Kathy Molina for their reviews.

LITERATURE CITED

Barlow, J. C., Leckie, S. N., and Baril, C. T. 1999. Gray Vireo (*Vireo vicinior*), in The Birds of North America (A. Poole and F. Gill, eds.), no. 447. Birds N. Am., Inc., Philadelphia.

Barlow, J. C., and Wauer, R. H. 1971. The Gray Vireo (*Vireo vicinior* Coues; Aves: Vireonidae) wintering in the Big Bend region, west Texas. Can. J. Zool. 49:953–955.

Bates, J. M. 1992a. Frugivory on *Bursera microphylla* (Burseraceae) by wintering Gray Vireos (*Vireo vicinior*, Vireonidae) in the coastal deserts of Sonora, Mexico. Southwest. Nat. 37:232–258.

Bates, J. M. 1992b. Winter territorial behavior of Gray Vireos. Wilson Bull. 104:425–433.

Dice, J. C., Jorgensen, M. C., Pilcher, K. L., Smith, C. H., and Thériault, R. 1992. Known populations of Elephant Trees (*Bursera microphylla*) in Anza–Borrego Desert State Park, San Diego County, California. Calif. Dept. Parks and Recreation, 8885 Rio San Diego Dr., Suite 270, San Diego, CA 92108.

Earthwalk Press. 1994. Anza–Borrego Desert region recreation map. Earthwalk Press, Eureka, CA.

Fry, A. J., Rojas-Soto, O. R., and Navarro S., A. G. 1996. A winter record of the Gray Vireo from San Luis Potosí, Mexico. W. Birds 27:54–55.

Grinnell, J. 1928. A distributional summation of the ornithology of Lower California. Univ. Calif. Publ. Zool. 32:1–300.

Grinnell, J., and Miller, A. H. 1944. The distribution of the birds of California. Pac. Coast Avifauna 27.

Howell, S. N. G., and Webb, S. 1995. A Guide to the Birds of Mexico and Northern Central America. Oxford Univ. Press, Oxford, England.

Johnson, N. K. 1972. Breeding distribution and habitat preference of the Gray Vireo in Nevada. Calif. Birds 3:73–78.

Leukering, T., and Bradley, J. 1997. Some observations of birds on the central Mexican plateau. W. Birds 28:177–180.

Phillips, A., Marshall, J., and Monson, G. 1964. Birds of Arizona. Univ. of Ariz. Press, Tucson.

Remsen, J. V. 1978. Bird species of special concern in California. Calif. Dept. Fish & Game, Wildlife Mgmt. Branch Admin. Rep. 78-1.

Skinner, M. W., and Pavlik, B. M., eds. 1994. Inventory of Rare and Endangered Vascular Plants of California. Calif. Native Plant Soc. Spec. Publ. 1, 5th ed.

Turner, R. M., Bowers, J. E., and Burgess, T. L. 1995. Sonoran Desert Plants: An Ecological Atlas. Univ. of Ariz. Press, Tucson.

Van Rossem, A. 1911. Winter birds of the Salton Sea region. Condor 13:129–137.

Wilbur, S. R. 1987. Birds of Baja California. Univ. of Calif. Press, Berkeley.

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BOOK REVIEW

Birding in the American West: A Handbook, by Kevin J. Zimmer. 2000. Cornell Univ. Press. 402 pages, scattered black-and-white line drawings and photographs. Paperback, $25. ISBN 0-8014-8328-X.

Some readers may remember a book entitled *The Western Birdwatcher*, by the same author and published in 1985. For some reason that book never made it "big," but it was regarded by many as a very useful work. *Birding in the American West* (hereafter BAW) is essentially an updated and expanded version of *The Western Birdwatcher*, and I hope it reaches a larger market, for it contains much of value. The geographic scope of BAW is vast and comprises the "western" United States from the eastern boundaries of the Dakotas, Nebraska, Kansas, Oklahoma, and Texas westward, including Alaska. Canada is not included, so the title is a political misnomer. BAW comprises five chapters, plus a single appendix, a bibliography, and an index.

Chapter 1 is a concise discussion of techniques that can help in finding any bird species, not simply in the West. These include habitat recognition, elevation, key plant species, seasonality, time of day, bird hotlines, recommendations for pelagic trips, taping, and ethics. Chapter 2 overviews subjects that help in field identification, including structure and behavior, molt and plumage, vocalizations, the importance of preparation, and the dangers of psychological influences—how to recognize the "I wouldn't have seen it if I hadn't believed it" syndrome. A summary of key characters for different groups (shearwaters, kingbirds, vireos, etc.) is provided, with subjective judgment of the degree of identification difficulty within each group. Chapter 3 is a short discussion of why one should keep a journal, with suggestions for format and tips on how not to fall behind in keeping notes. Chapter 4 covers a selection of "difficult identifications beyond the field guides," and Chapter 5 suggests where and when to find a selection of what the author terms "western specialties," ranging from resident breeding species to rare migrants and vagrants.

I recommend the first three chapters to all birders. Certain points will be obvious to some readers, others less so, but I suggest any birder could benefit from the information in these chapters. As is often the case, a review of a few general principles can help more than trying to memorize hundreds of miscellanous facts, and Zimmer does a good job of conveying the basic principles. For example, the key characters for groups (pp. 48–57) are very useful, although stating that swallow identification is "straightforward" is at odds with Chapter 4 (p. 228), where, more realistically, swallows "frequently present identification problems for birders." My attention was drawn to two points (one ethical, one factual) in the first two chapters. Although Zimmer's discussion of playing tapes to attract birds has some tips on how to use this technique while minimizing disturbance to the bird, he (p. 24) offers only two alternatives: disturb the bird with tape, or disturb the bird with chasing it and trampling its habitat. The very simple alternative of not disturbing a bird in either way could have been mentioned—for those with more concern for the bird's welfare than for their own list. "Heard birds" count as much on your life list as "seen birds" (this is in the American Birding Association's listing rules where it was introduced with the primary concern of reducing potential pressure and disturbance to birds). The second point is that the section on molt and plumage sequence (pp. 40–42) is the worst I have seen – any second printing should correct this section, or it should be deleted. For example, alternate plumage is attained *only* through a prealternate molt, *not* through wear as claimed, and attempts to explain duck molt (p. 41) and tern molt (p. 181) are replete with egregious errors of commission (correcting them here would take too much space). Fortunately the rest of the book is much better.

Chapters 4 and 5 will be of most use for birders living in or visiting western North America, although some identification problems have wider relevance. Chapter 4 is a compilation that should be valuable for beginning and intermediate-level birders. Most

of the subjects have been discussed elsewhere, but information is conveyed here with a different perspective that is always useful. The species treated range from loons and swans to *Empidonax* flycatchers and *Carpodacus* finches, with frequent reference to original articles. Most relevant references through 1996 are cited, but some from 1997 and 1998 were overlooked; e.g., Dunn and Beadle's (1998) important article on longspurs (*Birders' Journal* 7:68–93). The chapter is illustrated by a number of attractive and informative original line drawings (mainly by Shawneen Finnegan) and by black-and-white photographs of variable quality, most of which are dated (dates should be mandatory for identification-related photographs). Black-and-white photographs have limited utilty in this field, and I advocate color for future editions. For example, Figure 4.40 apparently shows a juvenile Semipalmated Sandpiper, but I doubt the photo will help readers resolve this common identification dilemma. In-depth treatment of many difficult identifications is avoided, and examples of relevant problems not covered include the Cliff and Cave swallows and the White and Black-backed wagtails. Some misconceptions are perpetuated (e.g., the dark eyes of "northern" Western Gulls), and the text is at times contradictory (jaegers show "no known consistent sexual dimorphisms" on p.141, yet Figure 4.49 is identified as a male Pomarine). Nonetheless, this chapter should bring many important identification points to a wider audience and serves as a useful reference for more experienced birders.

Chapter 5 concentrates on where and when one can find the "western specialties," a rather loose term given the geographic coverage. For example, it covers the Roseate Spoonbill (it occurs on the Gulf coast of Texas)! This chapter is an excellent synthesis of seasonal, geographical, behavioral, and habitat-related factors that one should consider when seeking a given species. Regional bird-finding guides that offer more detail are often referenced. "Specialties" covered range from the Streaked Shearwater to the Brant, and a second edition could save space by paring down this scope. More information is better than less, however, and Zimmer provides an invaluable summary for any birder living in or visiting the western U.S.

An appendix lists species mentioned in the text (in AOU 1998 sequence, with scientific names), and the rather idiosyncratic index includes common and scientific names for some but not all species; e.g., the genera *Junco* and *Tyrannus* are omitted.

It is obvious that BAW covers a multitude of topics and, given the huge subject matter, two questions come to mind. Does this book try to do too much? How much information is in it that you can't find elsewhere? One could argue that the answers are "yes" and "none," respectively, but I believe that BAW brings together a wealth of information in very readable format and it deserves a well-earned place on the bookshelf of a western birdwatcher.

Steve N. G. Howell

FEATURED PHOTO

A HYBRID HUMMINGBIRD IN SOUTHEAST ARIZONA

MATT HEINDEL, 11118 Auburn Woods, San Antonio, Texas 78249

STEVE N. G. HOWELL, Point Reyes Bird Observatory, 4990 Shoreline Highway, Stinson Beach, California 94970

Hybridization in hummingbirds is relatively frequent (e.g., Banks and Johnson 1961, Short and Phillips 1966, Wells et al. 1978, Pyle 1997), posing potential pitfalls for banders and other field ornithologists working with the Trochilidae. Adult males excepted, most North American hummingbirds are similar enough that most hybrids will almost certainly escape detection, even in the hand; moreover, only males showing a markedly "wrong" combination of characters are likely to stand out as hybrids. Just as hybrids must be considered prior to the identification of a rare gull, so must they be with hummingbirds.

Heindel photographed the hummingbird on the back cover in August 1999 in Miller Canyon, Huachuca Mountains, southeast Arizona. Even a quick glance suggests the subject is not one of North America's regularly occurring hummingbirds. This hummingbird appears large and lanky; in the field it looked similar in size to the Magnificent Hummingbirds (*Eugenes fulgens*) with which it shared the feeder. The crown, face, and back are moderately bright green. There is an obvious white postocular spot. The bill is of average length, appears to be all dark (but the base of the mandible appeared pinkish from directly below), and is generally straight and thick, with perhaps the slightest droop. The lower throat and the sides of the upper breast and lower neck are a deep green, noticeably richer and more intense than the surrounding color. In some lights, there was a bluish tinge to this color. The remainder of the underparts are paler, with a green lower breast merging into a grayish brown belly and gray undertail coverts. The angle of this photograph does not allow the middle of the back, rump, or tail to be assessed. Barely visible is some bronzy tone to the upper tail coverts. An important feature (often hard to see in the field) is a limited area of pale rufous across the secondaries, just inside the primary coverts. The tail and upper tail coverts were entirely bronzy, a stunning feature made all the more attractive by its absence from hummingbirds normally found north of Mexico. In the field, the throat appeared brighter and the wings more rufous than is evident in the photo, and the underwing coverts were laced with rufous brown. Because it does not conform with any expected species, one must ask if the bird is a hybrid. If so, what were its parents? Where would interbreeding of the parental species occur? How prevalent is hybridization among hummingbirds?

This bird's characters suggest a hybrid Magnificent × Berylline Hummingbird (*Amazilia beryllina*). The size, postocular spot, and general plumage color are those of a Magnificent Hummingbird, and its vocalizations were similar to that species'. The pale rufous in the wings, the bronzy tail and upper tail coverts, pinkish-based mandible, and the intensity of color on the lower throat and sides of the neck are marks in favor of the Berylline. Determining parentage of hybrids can be exceedingly difficult. Hybrid offspring may resemble either parent, show a blend of characters, demonstrate a mosaic of the parents' characters, or show features absent in either parent. Usually, conclusions must be tentative unless the parents' breeding was monitored. Even so, in this case the combination of characters fits rather nicely with the hypothesized parentage, and other potential combinations seem unlikely. Among the few hummingbirds with rufous in the wings, only the Berylline has reached the

United States; the rest are southern species extremely unlikely to get here. Similarly, few North American hummingbirds approach the size of a Magnificent, and no giants occurring north of the tropics share the male Magnificent's distinctive postocular spot. The extensive throat and neck patch and the occasional tinges of blue might suggest a Broad-billed Hummingbird (*Cynanthus latirostris*), a species reported to hybridize with the Magnificent (Phillips et al. 1964, Short and Phillips 1966), but both of these species lack rufous in the wings and on the upperparts.

Given that the Berylline Hummingbird has bred in the U.S. (Anderson and Monson 1981), one might speculate that a wandering Berylline paired up with a Magnificent somewhere near the international border; alternatively, these two species could have paired in Mexico and their offspring wandered north to the U.S. What is presumed to have been the same bird returned to Miller Canyon late in the summer of 2000, looking much as it does in the featured photo, and was banded at that time (George West pers. comm.).

We thank Michael A. Patten and George West for discussions of this bird and for other interesting conversations about hummingbirds. Robb Hamilton significantly improved this paper, and we thank him for his input.

LITERATURE CITED

Anderson, J. O., and Monson. G. 1981. Berylline Hummingbird nests in Arizona. Continental Birdlife 2:56–61.

Banks, R. C., and Johnson, N. K. 1961. A review of North American hybrid hummingbirds. Condor 63:3–28.

Phillips, A. R., Marshall, J., and Monson, G. 1964. The Birds of Arizona. Univ. of Ariz. Press, Tucson.

Pyle, P. 1997. Identification Guide to North American Birds, part 1. Slate Creek Press, Bolinas, CA.

Short, L. L., and Phillips, A. R. 1966. More hybrid hummingbirds from the United States. Auk 83:253–265.

Wells, S., Bradley, R. A., and Baptista, L. F. 1978. Hybridization in *Calypte* hummingbirds. Auk 95:537–549.

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Philip Unitt

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We look forward to seeing you in Reno!

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